EXPLANATIONS FOR INFREQUENT READING IN PRIMARY AND SECONDARY SCHOOL STUDENTS:

Reading motivation, selection of appropriate books, and behavioral routines

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The research reported in this dissertation was funded by a grant from the Art of Reading [Kunst van Lezen] (the National Library of the Netherlands [Koninklijke Bibliotheek] and the Dutch Reading Association [Stichting Lezen]).

Provided by thesis specialist Ridderprint, ridderprint.nl
Printing: Ridderprint
Layout and design: Sara Terwisscha van Scheltinga, persoonlijkproefschrift.nl
Cover design: Sara Terwisscha van Scheltinga, persoonlijkproefschrift.nl

DOI: http://doi.org/10.5463/thesis.394

VRIJE UNIVERSITEIT

Explanations for infrequent reading in primary and secondary school students: Reading motivation, selection of appropriate books, and behavioral routines.

ACADEMISCH PROEFSCHRIFT

ter verkrijging van de graad Doctor aan
de Vrije Universiteit Amsterdam,
op gezag van de rector magnificus
prof.dr. J.J.G. Geurts,
in het openbaar te verdedigen
ten overstaan van de promotiecommissie
van de Faculteit der Geesteswetenschappen
op vrijdag 8 december 2023 om 11.45 uur
in een bijeenkomst van de universiteit,
De Boelelaan 1105

door

Neeltje Elisabeth van der Sande

geboren te Gorinchem

promotoren:	prof.dr. R.C.M. van Steensel prof.dr. A.G. Bus
promotiecommissie:	prof.dr. J.H.C. Bel prof.dr. M.M.R. Coene prof.dr. H. Van Keer prof.dr. P.C.J. Segers dr J.J.M. Dera

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1

GENERAL INTRODUCTION

For many students in the upper grades of primary education and secondary education, reading is only a minor part of their leisure time activities (Inspectorate of Education, 2022; Nippold et al., 2005; Strommen & Mates, 2004; Twenge et al., 2018; Wennekers et al., 2018). Although most students read plenty of short texts—for example, messages from peers on their smartphones—they spend little time reading longer texts, such as books, newspaper or magazine articles, or longer internet texts. In a representative time-use survey, only 53 percent of the Dutch 13- to 19-year-olds reported continuously reading a book or other longer text during leisure time for at least ten minutes per week (Wennekers et al., 2018). Further, many students do not effectively use the time scheduled for reading at school: they are only minimally engaged during activities such as Independent Silent Reading (Reutzel et al., 2010). This likely has negative consequences for their reading development, as more print exposure is related to better reading comprehension, more fluent reading, and a larger vocabulary (Allington & McGill-Franzen, 2021; Mol, 2022; Mol & Bus, 2011). About a quarter of the Dutch 15-year-old students do not reach a target level of reading skills which is considered the minimum to function optimally in school and society (Gubbels et al., 2019). They particularly lag on higher-order comprehension skills necessary to engage in 'deep reading', which involves "the array of sophisticated processes that propel comprehension and that include inferential and deductive reasoning, analogical skills, critical analysis, reflection, and insight" (Wolf & Barzillai, 2009, p. 32). Therefore, educational policymakers and reading promotors (teachers, librarians) are looking for ways to stimulate students' reading. To make decisions on how to do this effectively, insight into reasons that students have for infrequent reading is indispensable. Therefore, the aim of this dissertation is to investigate why many students infrequently read despite its potential benefits. In the sections below, three possible reasons for infrequent reading are suggested.

Reading Motivation

Some researchers suggest that infrequent reading results from low reading motivation (e.g., De Naeghel et al., 2012; McGeown et al., 2016; Schaffner et al., 2013; Schiefele et al., 2012). Negative beliefs about reading may incite a downward spiral: students with low reading motivation behave correspondingly and read less often, which hampers their reading development. This results in poorer reading skills and more negative reading experiences, which in turn leads to a lower inclination towards voluntary reading (Guthrie & Davis, 2003; Morgan et al., 2008; Stanovich, 1986; Vaknin-Nusbaum et al., 2018). The likelihood of negative experiences increases halfway during primary education and can be linked to changes in requirements at school (Gottfried et al., 2001; Jacobs et al., 2002; McKenna et al., 1995; Miyamoto et al., 2020; Parsons et al., 2018). Around Grade 4, there is a shift from 'learning to read' to 'reading to learn' (Chall

& Jacobs, 2003; Guthrie & Davis, 2003). In the lower grades, instruction is mainly focused on decoding and students receive guidance while reading texts attuned to their reading level. From fourth grade on, reading is predominantly used as a tool for education and students read increasingly challenging texts. As a result, reading skills development of many students hampers, which is referred to as the 'fourth-grade slump' (Chall & Jacobs, 2003). At the same time, students around this age receive less guidance during reading. After students have learned to decode in the first three years of instruction, they are often assumed to be able to read independently (Snow & Moje, 2010). Snow and Moje refer to this as the 'inoculation fallacy': an early 'vaccination' of reading instruction is assumed to protect permanently against reading failure. The decline in reading skills development combined with a lack of guidance might explain why many students lose interest in reading in the stage that reading becomes an important tool for learning (Guthrie & Davis, 2003; Nielen, 2016).

Motivational theories suggest several factors that hamper reading motivation (Schiefele et al., 2012): students may not like reading because they lack autonomy (they do not feel they can control what they read), they do not feel competent to successfully complete reading tasks, or they do not experience 'relatedness' when reading (they do not feel reading is valued by relevant others such as peers; Ryan & Deci, 2000). Educational interventions to promote motivation target such factors. Teachers may, for instance, support autonomy by offering students choices in the texts they read and by allowing them input in the curriculum (Stefanou et al., 2004). Feelings of competence can be fostered by matching texts to students' reading level, by providing supportive feedback, or by teaching strategies that support reading comprehension (Bandura, 1997; Margolis & McCabe, 2003; Walker, 2003). Interactions about books and collaborative reading activities can contribute to feelings of relatedness (Baker, 2003; Nolen, 2007). These and other motivational mechanisms are applied in various reading motivation interventions. In the first study of this dissertation, I examined whether a lack of reading motivation could explain infrequent reading by testing the effects of interventions triggering positive beliefs about reading: I assumed that, if motivation is a factor in reading, triggering positive beliefs would result in more and, consequently, in better reading.

Selection of Appropriate Books

Infrequent reading might also result from the inability to select appropriate reading materials (Merga, 2014; Merga & Roni, 2017). Reading promotion often takes the form of increasing the availability of books in school. In the Dutch program the Library *at school* (de Bibliotheek *op school*; http://www.debibliotheekopschool.nl), public libraries provide primary and secondary schools with a varied and up-to-date selection of

books (Huysmans et al., 2013; Nielen & Bus, 2015). Schools often use these books during Independent Silent Reading (ISR), fixed periods of time in which students read self-selected books (Garan & DeVoogd, 2008; Krashen, 2006; Manning et al., 2010). The assumption is that access to a diverse and high-quality collection increases the likelihood of students finding books that interest them, leading to higher engagement during ISR.

However, simply increasing the availability of books may not be sufficient. Even if students have access to a varied collection, they may not benefit from activities such as ISR if they are unable to select appropriate books (Reutzel et al., 2010). Due to insufficient selection strategies, students—particularly those with poorer reading skills—may struggle to find books that match their skills and interests (Hairell et al., 2010; Merga, 2018, 2019; Merga & Roni, 2017). I expected that these students would benefit from guidance in book selection: expert help in choosing books could prevent negative reading experiences and thus contribute to reading frequency. In the second study of this dissertation, I tested whether difficulties in selecting appropriate books explain infrequent reading by examining the effects of personalized expert guidance in selecting books on students' reading attitude, familiarity with book titles, and reading comprehension.

Behavioral Routines

Finally, infrequent reading may result from behavioral routines. The basic assumption behind this explanation is that much of our behavior is not the result of conscious choices, but rather of automatic, 'fast' decisions (Kahnemann, 2011). During leisure time, numerous activities compete for students' attention (Willingham, 2017). Some of these activities are more salient than others: activities on social media or gaming, for instance, are likely to be more enticing than reading because they offer immediate rewards and require less effort (Hughes-Hassell, 2007; Merga, 2014; Willingham, 2017). Infrequent reading may then be explained by the fact that—even though students may recognize the value of reading—they routinely opt for those more salient activities and do not consider reading as a possible behavioral alternative during leisure time.

To test this hypothesis, I examined the effect of 'nudging'. Nudging is an intervention technique that targets automatic decisions: it involves creating changes in people's environments that increase the salience of desired behavior (Thaler & Sunstein, 2008; Weijers et al., 2023). One type of nudging are reminders (Carlzolari & Nardatto, 2017; Sunstein, 2014). I assumed that reminding students of the option to read may make reading a more salient behavioral alternative and thus draw students' attention to reading as a possible leisure time activity. In the final study of this dissertation, I

examined whether behavioral routines could explain infrequent reading by testing whether sending reminders to students or their parents via WhatsApp resulted in a more positive reading attitude, more familiarity with books, and better reading skills.

Overview of this Dissertation

In five different studies described in three subsequent chapters, the hypothesized reasons behind infrequent reading are examined. Chapter 2 focuses on reading motivation: it describes the outcomes of a meta-analysis testing the effects of educational interventions promoting positive beliefs about reading. Chapter 3 focuses on the selection of appropriate books: it presents two experiments (one with students in Grades 4-6 of primary education and the other with students in Grades 7 and 8 of prevocational secondary education) that explore whether helping students find books that match their interests and reading level affects their reading. Chapter 4 focuses on behavioral routines: it describes two experiments (with comparable samples as those in Chapter 3) that test whether bringing reading to students' attention through reminders may shift their behavior toward more frequent reading. Finally, Chapter 5 summarizes and discusses the findings of the studies, providing implications for reading promotion practice and suggestions for further research.

2

EFFECTIVENESS OF INTERVENTIONS THAT FOSTER READING MOTIVATION: A META-ANALYSIS

This chapter is based on:

Van der Sande, L., Van Steensel, R., Fikrat-Wevers, S., & Arends, L. (2023). Effectiveness of interventions that foster reading motivation: A meta-analysis. *Educational Psychology Review, 35*(21), 1-38. http://doi.org/10.1007/s10648-023-09719-3

ABSTRACT

Many students have low reading motivation. Based on (reading) motivation theories, several mechanisms are distinguished that can foster reading motivation. Our goal in this meta-analysis was to examine the effects of theory-driven reading motivation interventions in school on students' reading motivation and reading comprehension as well as to test which mechanisms are particularly effective in fostering motivation and comprehension. We conducted a literature search in ten online databases and identified 39 relevant effect studies. Positive effects on affirming motivations (Cohen's d = 0.38), extrinsic motivations (Cohen's d = 0.42), combined motivations (Cohen's d = 0.17), and reading comprehension (Cohen's d = 0.27) were found. The effect on undermining motivations (Cohen's d = -0.01) was not significant. In particular, interventions that aimed to trigger interest had positive effects on affirming motivations and reading comprehension. Further, effects on affirming motivations were larger if the total duration of the intervention was longer and if the share of boys in the sample was higher. Interventions delivered by researchers had larger effects on reading comprehension than interventions delivered by teachers. Finally, effects on reading comprehension were larger for primary schoolers than for secondary schoolers and larger for typical readers than for struggling readers. Implications for practitioners, policymakers, and researchers are discussed.

Keywords: reading, motivation, comprehension, interventions, meta-analysis

Substantial numbers of students have problems comprehending texts. They are not able to perform reading tasks at the level considered the minimum required to participate fully in society (OECD, 2019a) and experience difficulties in school, as understanding texts is needed to acquire knowledge in different content domains (Reschly, 2010; Snow, 2002). These problems are partly related to students' reading motivation, which can be defined as 'the drive to read resulting from a comprehensive set of an individual's beliefs about, attitudes towards, and goals for reading' (Conradi et al., 2014, p. 154). Research shows that students who are motivated to read, read more often and have better reading comprehension ability (Mol & Bus, 2011; Schiefele et al., 2012; Toste et al., 2020). However, substantial numbers of students have low reading motivation levels and only read infrequently (Nippold et al., 2005; OECD, 2019b; Strommen & Mates, 2004). Therefore, it is argued that reading instruction should not only focus on skills instruction but also on the promotion of reading motivation (e.g., De Naeghel & Van Keer, 2013; Vaknin-Nusbaum et al., 2018). The first aim of the current meta-analysis was to investigate to what extent theory-driven reading motivation interventions in school can contribute to higher reading motivation and whether this is accompanied by an increase in reading comprehension. Our second aim was to get more insight into what are effective ways to foster reading motivation.

Effects of Reading Motivation Interventions: Previous Meta-analyses

So far, a few meta-analyses have been conducted in which the effects of reading motivation interventions have been synthesized and compared systematically. Guthrie et al. (2007) investigated the effects of Concept-Oriented Reading Instruction (CORI) on reading comprehension and different motivational variables, such as intrinsic motivation and self-efficacy. In CORI, motivational support and strategy instruction are combined in a content domain (e.g., science). Mean effect sizes for motivation ranged from Cohen's d = 0.12 to 1.20, with a median of 0.30. Mean effect sizes for reading comprehension were larger, ranging from Cohen's d = 0.65 to 0.93. More recently, Unrau et al. (2018) and McBreen and Savage (2020) examined the outcomes of a broader array of motivational interventions. Unrau et al. (2018) tested effects on reading self-efficacy and found a weighted mean effect size of Hedge's g = 0.33. McBreen and Savage (2020) established mean effect sizes of Hedge's g = 0.30 on reading motivation and Hedge's g = 0.20 on reading achievement.

These meta-analyses have a number of shortcomings. The reviews by Guthrie et al. (2007) and Unrau et al. (2018) have a limited scope, targeting either one specific intervention or one specific outcome measure, thereby possibly overlooking relevant results of other kinds of interventions or on other types of variables. The meta-analysis by McBreen and Savage (2020) is more comprehensive but has three other drawbacks.

First, the authors have included interventions both with and without a theoretical basis, which makes it difficult to draw conclusions on the mechanisms that steer intervention effects. Second, their meta-analysis includes both targeted and broad interventions, the latter including programs that combine motivational and other types of support (i.e., skills instruction). Since they do not use this variable as a moderator, definite conclusions on the effects of motivational support cannot be drawn: positive outcomes might very well be the result of other elements of the intervention. Third, McBreen and Savage (2020) based their moderator analyses on one, undifferentiated reading motivation variable, covering such concepts as intrinsic motivation, self-efficacy, value, and extrinsic motivation. However, not all forms of motivation are equally beneficial for reading outcomes.

The present meta-analysis aims to meet these shortcomings in four ways. First, we take a broad scope, that is, we analyze the effects of a range of motivational programs on a variety of motivational outcomes. Second, we limit ourselves to theory-based interventions. This allows us to test which theoretical mechanisms contribute to the promotion of reading motivation and comprehension, thereby providing better insights into the effective ingredients of motivational interventions (see Motivational mechanisms for a further explanation). Third, we aim to draw conclusions on the added value of motivational interventions by testing whether effects differ between programs that combine motivational support with skills instruction and those that do not. Fourth and finally, we apply a more differentiated approach to the moderator analyses. We based our approach on an analysis of the extent to which different types of motivation are beneficial for reading development. Based on previous conceptualizations of reading motivation (Schiefele et al., 2012; Guthrie & Coddington, 2009), we categorized motivational outcomes as *affirming* (e.g., intrinsic motivation and reading self-efficacy), *extrinsic* (e.g., reading for competition and recognition), or *undermining* (e.g., avoidance goals and perceived difficulty of reading). Affirming motivations are found to be most favorable for students' reading achievement, whereas undermining motivations are unfavorable (Guthrie & Coddington, 2009; Guthrie et al., 2013; Ho & Guthrie, 2013; Van Steensel et al., 2019). Extrinsic motivations have been found to have small, no, or even negative effects on reading achievement (Becker et al., 2010; Schaffner et al., 2013; Schiefele et al., 2012; Stutz et al., 2016).

Reading Motivation Theories

Motivation is a complex construct with multiple dimensions (Conradi et al., 2014; Murphy & Alexander, 2000; Schiefele et al., 2012; Wigfield, 1997). These dimensions are elaborated in various motivation theories, which are also applied in the field of reading motivation (Conradi et al., 2014; Cook & Artino, 2016; Guthrie & Wigfield, 1999;

Linnenbrink-Garcia et al., 2016; Wigfield, 1997). Influential motivation theories are self-determination theory (SDT; Ryan & Deci, 2000), expectancy-value theory (EVT; Wigfield & Eccles, 2000), social cognitive theory (SCT; Bandura, 1986), interest theory (IT; Hidi & Renninger, 2006; Krapp, 2002), achievement goal theory (AGT; Ames, 1992; Pintrich, 2000), and attribution theory (AT; Weiner, 1985). An adjacent model that is relevant to the field of reading motivation research is the reading engagement model (REM; Guthrie et al., 2007). Table 1 provides an overview and description of these theories.

Motivational Mechanisms

Together, the theories described in Table 1 propose several mechanisms through which affirming motivations, in particular, can be fostered. Feelings of autonomy, relatedness, and competence are central to SDT, which posits that motivation becomes more internalized to the extent that these psychological needs are met (Niemic & Ryan, 2009; Ryan & Deci, 2000). Applied to reading, autonomy can for example be supported by offering students a choice of texts (Stefanou et al., 2004). Positive interactions about books and collaboration in the classroom can contribute to feelings of relatedness (Guthrie et al., 2004; Nolen, 2007). Feelings of competence can be fostered by matching texts to students' reading levels, by teaching strategies that support text comprehension, or by providing supportive feedback (Bandura, 1997; Margolis & McCabe, 2003; Walker, 2003). The need for competence is also central to EVT and SCT, which assume that expectancies of success and self-efficacy, respectively, promote students' motivation to engage in activities such as reading (Bandura, 1986; Cook & Artino, 2016; Linnenbrink-Garcia et al., 2016; Wigfield, 1997; Wigfield & Eccles, 2000).

In IT, interest is considered a driving force in student motivation and learning (Hidi & Renninger, 2006; Krapp, 2002). Students' interest could for example be triggered by the use of interesting texts (Ryan & Deci, 2000; Schiefele, 1999) or by making real-world connections (Guthrie et al., 2007). The concept of interest also resounds in the concept of intrinsic value in EVT (Cook & Artino, 2016; Schiefele et al., 2012; Wigfield, 1997).

Based on AGT, stimulating (mastery) goals for reading may have beneficial effects on students' reading motivation (Ames, 1992; Elliot, 1999; Pintrich, 2000). Mastery goals can be stimulated by stressing individual development instead of making social comparisons (Ames, 1992) and by integrating reading activities in 'thematic units' to build expertise (Guthrie et al., 2004).

Table 1. Overview of Influential (Reading) Motivation Theories

Theory	Description
Self-determination theory	SDT distinguishes between intrinsic and extrinsic motivation (Ryan & Deci, 2000). Intrinsic motivation is fully internalized and refers to engaging in an activity because it is inherently enjoyable. Extrinsic motivation refers to engaging in an activity to achieve some external goals and is subdivided into different categories, ranging from least to most internalized: external, introjected, identified, and integrated regulation. Internalization of motivation is driven by whether the basic psychological needs of autonomy, competence, and relatedness have been met (Niemic & Ryan, 2009; Ryan & Deci, 2000).
Expectancy-value theory	Motivation is influenced by expectations of success and subjective task value. Expectancies refer to students' beliefs about their capabilities to perform a task successfully and values reflect reasons for doing an activity (Wigfield & Eccles, 2000). Four types of values are distinguished: 1) intrinsic value, which means that a topic or activity is considered enjoyable; 2) attainment value, which is the personal importance attached to mastering a skill; 3) utility value, which is the usefulness of a specific task or skill, for example, to reach future goals; and 4) costs, the costs accompanied by performing a task, for example, in terms of time and energy (Wigfield & Eccles, 2000).
Social cognitive theory	According to SCT, human behavior results from interactions between personal, behavioral, and environmental factors. A key concept in this theory is self-efficacy, which represents a person's sense of being able to succeed in a task. Self-efficacy can be acquired by various (social) experiences: particularly mastery experiences are a driving force in students' self-efficacy (Bandura, 1986).
Interest theory	Interest theory proposes that motivation is triggered by a preference for certain topics, subject areas, or activities (Schiefele, 1991). Interest can either be situational, which can be defined as the temporary interest aroused by features of an activity, or individual, which is a relatively stable characteristic of a person (Hidi & Renninger, 2006; Krapp, 2002).
Achievement goal theory	Three types of goals can be identified: mastery goals (focus on developing competence and personal improvement), performance-approach goals (focus on demonstrating competence and outperforming others), and performance-avoidance goals (focus on avoiding failure and appearing incompetent; Ames, 1992; Elliot, 1999; Pintrich, 2000). Mastery goals are often associated with higher motivation and more favorable outcomes than performance-approach goals, whereas performance-avoidance goals are generally associated with negative outcomes (Ames, 1992; Elliot, 1999; Van Yperen et al., 2015).
Attribution theory	Learners create subconscious attributions of success and failure. These attributions vary in terms of locus, stability, and controllability and are related to the amount of control students feel over their learning (Weiner, 1985). Students who feel in control over their learning will be more motivated to put effort into a task.
Reading engagement model	REM is based on various motivation theories (SDT, SCT, and AGT; Guthrie et al., 2007). Engaged reading refers to both motivated and strategic interaction with texts, correlates with reading comprehension, and can be fostered by educational practices. It is assumed that if motivational and strategy support are combined, engaged reading and reading comprehension are enhanced (Guthrie et al., 2004).

According to AT, motivation could be fostered by changing students' attributions for learning. For example, if teachers emphasize that effort leads to success in reading and that failure is not caused by a lack of ability, this is expected to lead to more favorable attributions (Toland & Boyle, 2008; Weiner, 1985).

In REM, motivational support and strategic instruction are combined. As REM is based on SDT, SCT, and AGT, the motivational mechanisms of these theories are central to REM (Guthrie et al., 2007). According to REM, motivation is fostered if students' interest is triggered, feelings of autonomy, relatedness, and competence are supported, and mastery goals are pursued (Guthrie et al., 2004).

Interventions may also focus on stimulating extrinsic forms of reading motivation. EVT encompasses values that are more external to students: attainment value and utility value, which could be fostered by emphasizing why reading is relevant and how developing one's reading skills may help to reach future goals (Guthrie & Klauda, 2014; Wigfield & Eccles, 2000). According to SDT, extrinsic motivators, such as rewards, may be expected to contribute to extrinsic motivations (Ryan & Deci, 2000). However, given the outcomes of previous research (Becker et al., 2010; Schaffner et al., 2013; Schiefele et al., 2012; Stutz et al., 2016), we do not expect interventions that mainly target extrinsic forms of motivation to positively contribute to students' reading development.

Other Possible Moderators of Intervention Effects

In addition to the effects of motivational mechanisms, we were interested in other variables that might moderate intervention effects. These variables can be categorized as intervention, sample, study, and measurement characteristics.

Regarding intervention characteristics, we were first of all interested in whether effects differed between programs that focused on motivation only and programs that combined motivational support with other types of support. As explained earlier, inherent to many programs is that they combine motivational support with skills instruction, which makes it difficult to infer whether effects are caused by investing in student motivation (McBreen & Savage, 2020). Comparing programs that also include skills instruction with those that do not, can provide an indication of the unique contribution of motivational support: such a comparison enables to analyze whether effects are still present when skills instruction is left out of the equation.

In addition, we were interested in moderators such as text genre, program duration, and the provider of the intervention. Students' reading motivation may vary across different text genres: several studies indicate that students are more motivated to

read narrative texts than informational texts (Guthrie et al., 2007; Lepper et al., 2021; McGeown et al., 2020; Parsons et al., 2018). It is thus interesting to examine whether focusing on a specific genre has consequences for intervention effects. Concerning the duration of the intervention, we focused both on the number of sessions and the total amount of time students were exposed to the intervention. Although it may be expected that interventions are more effective if the duration of the intervention is longer, no effect of length of treatment was found in the meta-analysis by Unrau et al. (2018), indicating that longer interventions were not necessarily more effective than shorter interventions. Regarding the provider of the intervention, programs delivered by researchers may be more effective than those by teachers, as the former might be better able to deliver the interventions as intended (Edmonds et al., 2009; Okkinga et al., 2018).

Particular subgroups—secondary schoolers, struggling readers, and boys—are at greater risk of having low reading motivation (Baker & Wigfield, 1999; Gottfried et al., 2001; Jacobs et al., 2002; Logan & Johnston, 2009; McKenna et al., 1995; McKenna et al., 2012; Parson et al., 2018; Toste et al., 2020; Vaknin-Nusbaum et al., 2018). Therefore, we were interested in whether interventions were more effective for these groups of students: we tested whether intervention effects were moderated by sample characteristics such as educational stage (primary versus secondary education), reading level, and gender.

Further, we were interested in study characteristics such as how students were assigned to experimental and control groups, whether control groups received any treatment, and implementation quality. These variables might have consequences for the validity of conclusions on intervention effects. For instance, if students are not randomly assigned to experimental and control groups, differences between the groups might be explained by factors other than the intervention (Lispey, 2003). If part of the intervention is also offered to the control group, differences between the experimental and control group may be less pronounced (Wilson & Lipsey, 2001).

We also tested the effects of two measurement characteristics: measurement type and whether instruments were developed within the context of the study. For measurement type, a distinction was made between self-reports, teacher-reports, observations, and tests. Instruments that were developed within the context of the study may be expected to be more closely related to the content of an intervention, and therefore yield larger effects than study-independent measures (McBreen & Savage, 2020; Wilson & Lipsey, 2001). Operationalizations of all moderators are described in the Method section.

Research Questions

The objectives of the current meta-analysis resulted in the following research questions:

1. What are the effects of reading motivation interventions on reading motivation and reading comprehension?
2. Which intervention, sample, study, and measurement characteristics moderate intervention effects?

METHOD

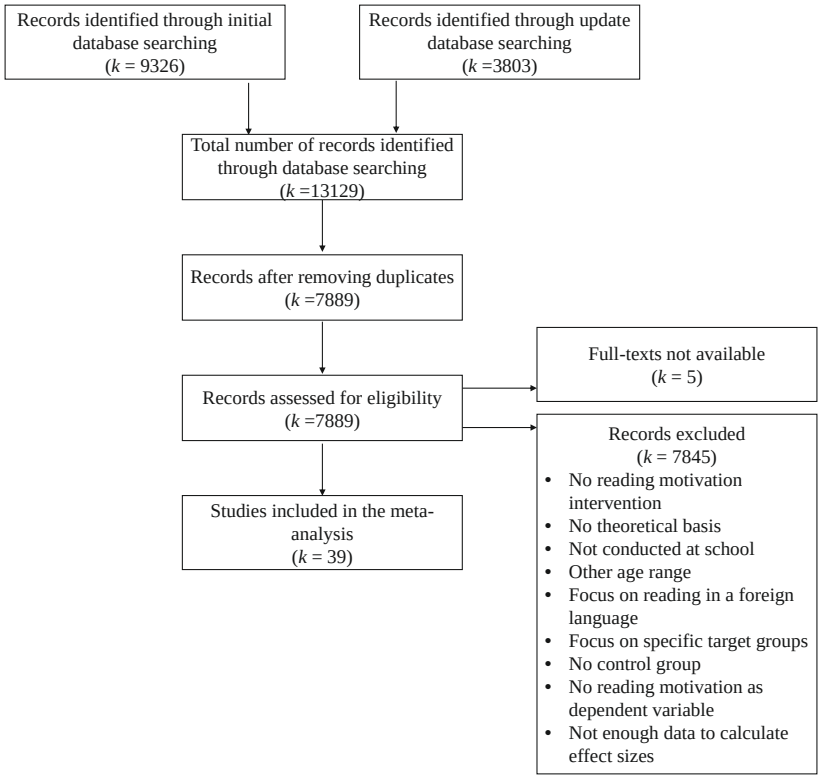
Literature Search and Selection Criteria

Eight electronic databases were searched: Embase (via embase.com), MEDLINE and PsycINFO (via Ovid), Web-of-Science, Scopus, ERIC, and CINAHL (via EBSCOhost), and Cochrane Central (via Wiley). Additional references were retrieved from PubMed (the subset as supplied by the publisher, containing the most recent, nonindexed articles) and Google Scholar. The search strategies were designed by the researchers together with an experienced librarian. Three sets of terms were combined: terms for *reading*, for *motivation*, and for *educational interventions* or *programs*. All terms were thesaurus terms and words in the title and/or abstract. A broad filter for studies related to children (aged 6 to 18 years) was used. The search was limited to articles published in peer-reviewed journals, to increase the probability of including studies with high methodological quality. A full overview of the search strategies for all databases can be found in Appendix 2A. In the initial search, which was carried out on 8 April 2019, 9326 titles were identified, of which 5723 remained after removing duplicates. An update of the search on 6 May 2022 resulted in 3803 additional titles, of which 2166 remained after removing duplicates. Studies were included if they met the following criteria: (a) the effects of an intervention aimed at fostering reading motivation were analyzed, (b) the intervention was based on a (reading) motivation theory, (c) the intervention was conducted at school, (d) the study focused on children in the range from Grade 1 until the end of secondary school, (e) the study contained an experimental and control group, (f) the dependent variables included measures of reading motivation, and (g) the study provided effect sizes or information allowing the calculation of effect sizes (sample size, means, and SD's, or results of statistical testing). Studies were excluded (a) if the paper was in another language than English, (b) if the focus of the intervention was on reading in a foreign language, and (c) if the study focused on specific target groups (e.g., children with learning, emotional, or behavioral disorders).

All results of the initial literature search were screened on title and abstract according to these criteria by the first and third authors. The results of the search update were

screened by the first author and a graduate student. They screened and coded all titles independently. Full texts of possibly relevant studies were assessed on the same criteria to compile the final selection. If articles were not directly accessible, we tried to retrieve them by contacting the authors. For five possibly relevant articles, we were not able to retrieve the full text. If studies were eligible, but the statistical data reported were insufficient to be included in the meta-analysis, we e-mailed the authors to request the necessary information. In this way, we received additional data for four studies. This final stage of screening led to the inclusion of 33 studies in the initial search and six studies in the search update. Thus, 39 studies were included in the meta-analysis. We additionally consulted the reference lists of the meta-analyses by Guthrie et al. (2007) and McBreen and Savage (2020). However, this did not lead to the inclusion of any additional studies. All studies in these meta-analyses that met our inclusion criteria were already identified by our literature search. Interrater agreement for the selection of studies was 99.6%. Disagreements were discussed until an agreement was reached. For a schematic overview of the selection procedure, see the flow chart in Figure 1.

Figure 1. Flow Chart of Study Selection in the Meta-analysis



Coding Procedure

All included studies were coded according to a scheme, which was developed and pilot-tested by the first and second authors. The scheme allowed the coding of bibliographic information, intervention characteristics, sample characteristics, study characteristics, and measurement characteristics. All studies of the initial search were double-coded by the first and third authors. Studies of the search update were double-coded by the first author and a graduate student. Interrater agreement was 90.3% (range: 80.4% to 100%). Interrater agreement was lowest for the number of sessions and the total duration of the intervention, often because the information provided by the primary studies was unclear. All disagreements were discussed until a consensus was reached.

The following bibliographic information was recorded: title of the article, author name(s), and publication year. In the intervention characteristics section, the name of the intervention was registered and codes were given for its theoretical basis, the motivational mechanism(s) it tried to elicit, whether skills instruction was provided, the type of texts used in the intervention, the provider of the intervention, the number of sessions, and the total duration of the intervention. Interventions were only coded as based on a specific theory if the theory itself, key theorists, and/or key concepts of the theory were explicitly mentioned and linked to the content of the intervention. Regarding motivational mechanisms, we coded whether the intervention aimed to support autonomy, relatedness, or feelings of competence, trigger interest, stimulate mastery goals, change attributions, emphasize the value of reading, or whether it offered extrinsic motivators. Interventions were coded as providing skills instruction if motivational support was, for example, complemented by reading strategy instruction or fluency practice. Concerning text genre, we specified whether narrative texts, informational texts, or both were used. In some interventions, no texts but only sentences or words were used for reading. The assumption underlying such studies is that increased feelings of competence in word reading may also increase students' motivation for reading texts (Toste, 2017, 2019). We also specified whether the intervention was delivered by researchers or not. Finally, the number of sessions and total duration of the intervention (the number of sessions multiplied by the duration of one session) were registered.

Samples were described according to the following variables: gender, educational stage, and reading level. We specified the percentage of boys in the sample, made a distinction between primary and secondary schoolers (as indicated in the original study), and we specified whether the sample consisted mainly of struggling readers. A sample was considered to consist mainly of struggling readers if the authors reported that at least 50% of the participants lagged in reading achievement (e.g., based on standardized test scores).

Concerning study characteristics, information was recorded on the design of the study, control group type, and implementation quality. We distinguished experiments and quasi-experiments. Studies were only coded as an experiment if randomization was applied at the individual level. If classes or schools were randomly assigned to the experimental and control condition, this was considered a quasi-experimental design. For all control groups, we specified whether they also received (part of) an intervention, which may have contributed to their reading motivation and/or reading comprehension. Further, we registered information about implementation quality. However, many studies did not report on implementation quality (38.5%) or, if they did, the available information varied considerably. Therefore, we had to exclude this variable from the analyses.

Concerning measurement characteristics, we first coded whether the effect measures pertained to reading motivation or reading comprehension. We focused on reading comprehension as indicator of reading achievement, as gaining meaning and knowledge from a text can be considered the main purpose of reading (Snow, 2002). All motivation variables were further categorized as affirming, extrinsic, or undermining. Intrinsic motivation, self-efficacy, mastery goals, perceived autonomy, social motivation, and intrinsic value of reading are considered (aspects of) affirming motivations (Guthrie & Coddington, 2009). Performance goals, reading for competition, and recognition were coded as extrinsic reading motivations (e.g., Guthrie & Coddington, 2009; Wigfield & Guthrie, 1997). Undermining motivations include constructs such as avoidance goals or reading anxiety (Guthrie & Coddington, 2009; Van Steensel et al., 2019). Some measures comprised indicators of more than one category (e.g., both intrinsic and extrinsic motivation), so a fourth category was added (combined motivations). Further, we coded whether the post-test was immediately after the intervention or delayed, which type of measurement was used, and whether instruments were developed within the context of the study or study-independent measures (e.g., standardized tests) were used. Finally, we entered the statistical information necessary to compute effect sizes (mean, *SD*, and *n*, or, if unavailable, test statistics such as *t* or *F*) or the effect sizes (Cohen's *d*, Hedges' *g*, or η^2) provided by the authors.

Data-analysis

Because some studies included more than one experiment, experimental condition, or subsample, 'experimental comparison' was used as the basis for the analyses. We first computed a weighted effect size for affirming motivations, extrinsic motivations, undermining motivations, combined motivations, and/or reading comprehension per experimental comparison (using the standardized mean difference: Cohen's *d*), for which we used the available statistical information. Some studies included one instrument with several subscales; in such cases, we selected the overall scale. If a

study included several indicators of reading motivation or reading comprehension, we aggregated the effect sizes per experimental comparison to prevent that the same experimental condition was included multiple times in the analyses and thus had a disproportionate contribution to the average effect.

If present, we used both pretest and posttest data for computing effect sizes. In some studies, no means and *SD*s were provided. In these cases, we used the effect sizes provided by the authors or computed the effect sizes based on statistical data such as *t*-values, *F*-values, and *p*-values, together with information on sample size.

We computed mean effect sizes for all outcome measures based on random-effects models, in which heterogeneity across studies is taken into account. To account for differences in sampling error related to sample size, random effects models weigh the mean effect size by the variance of the sample as well as by the variance between studies. To examine whether the variance in effect sizes between studies was related to intervention, sample, study, and measurement characteristics, we conducted moderator analyses based on categorical models analogous to ANOVA and with meta-regression in the case of continuous moderator variables. To test the between-group differences in the categorical random-effects analysis, we calculated the *Q*-statistic for between-group means. In the random-effects meta-regression models, we tested the significance of the individual regression coefficients with a *Z*-test.

Finally, we looked for indications of publication bias (Lipsey & Wilson, 1993). Duval and Tweedie's trim and fill method (Duval & Tweedie, 2000) indicated that the effect size for affirming motivations of 0.38 [0.25;0.50] would change into 0.47 [0.34;0.60] after correction for publication bias with eight trimmed studies. The presence of publication bias was not confirmed by Egger's linear regression test for asymmetry (intercept = 0.83; $SE = 0.71$; $t(53) = 1.17$, $p = .25$; Egger et al., 1997). For reading comprehension, Egger's linear regression test for asymmetry indicated significant publication bias (intercept = 2.17, $SE = 0.74$, $t(37) = 2.93$, $p = .01$). Duval and Tweedie's trim and fill method only revealed two trimmed studies. After correction for publication bias, the effect size would slightly change from 0.27 [0.17;0.37] to 0.30 [0.19;0.40]. Thus, weak indications for publication bias were found, but after correction for publication bias, effects would be larger instead of smaller. All analyses were performed by Author 4, using a registered copy of the Comprehensive Meta-Analysis statistical software (version 3.0; Biostat, Englewood, NJ).

RESULTS

Description of the Interventions

The 39 studies included in this meta-analysis encompass 40 interventions. An overview of all studies is provided in Appendix 2B. Four programs were examined in more than one study. CORI was evaluated in four studies (Study 10, 11, 36, and 37). Learning Strategies Curriculum (Study 5 and 6), United States History for Engaged Reading (Study 29 and 30), and Multisyllabic Word Reading + Motivational Beliefs (Study 32 and 33) were evaluated twice. The remaining interventions were included once.

Most interventions were based on the reading engagement model (*n* = 11; 28%). The other interventions were based on self-determination theory (*n* = 6; 15%), interest theory (*n* = 4; 10%), expectancy-value theory (*n* = 3; 8%), attribution theory (*n* = 3; 8%), social cognitive theory (*n* = 3; 8%), and achievement goal theory (*n* = 2; 5%). Eight interventions (20%) were based on a combination of motivation theories, namely AGT and SCT (*n* = 3; 8%), AGT and SDT (*n* = 2; 5%), IT and SDT (*n* = 1; 3%), IT and REM (*n* = 1; 3%), and REM and EVT (*n* = 1; 3%).

Regarding motivational mechanisms, most interventions aimed to trigger interest (*n* = 21; 53%), foster feelings of competence (*n* = 20; 50%), support relatedness (*n* = 14; 35%), stimulate mastery goals (*n* = 13; 33%), or support autonomy (*n* = 12; 30%). In a smaller number of interventions, motivation was fostered by changing attributions (*n* = 5; 13%), offering extrinsic motivators (*n* = 3; 8%), or emphasizing the value of reading (*n* = 1; 3%). Appendix 2C provides several examples of how these motivational mechanisms were applied in the interventions.

In approximately half of the interventions (*n* = 23; 58%), motivational support was complemented with skills instruction, such as teaching reading strategies or practicing fluent reading. In most interventions, narrative texts (*n* = 8; 20%), informational texts (*n* = 12; 30%), or both (*n* = 16; 40%) were used. In some interventions, only words or sentences were used for reading (*n* = 4; 10%). The interventions were delivered by either a researcher (*n* = 13; 33%) or someone else (*n* = 26; 65%), mostly teachers (*n* = 23) and in some cases preservice teachers (*n* = 1), volunteers (*n* = 1) or tutors with an undergraduate degree (*n* = 1). For one intervention, no information was provided about its provider. The total duration of the interventions varied strongly, ranging from less than half an hour to 195 hours. Although some interventions consisted of only one session, other interventions were implemented two lessons a day for several months (maximum of 260 sessions).

Most interventions targeted primary school students (*n* = 32; 80%), whereas a much smaller number of interventions was directed at secondary school students (*n* = 8; 20%).

Although most interventions focused on typical (i.e., heterogeneous groups of) readers (n = 25; 63%), a substantial number of the interventions targeted struggling readers (n = 15; 38%). The percentage of boys in the studies ranged from 35.42% to 75.00%.

Intervention Effects

To answer Research Question 1, we first analyzed the overall intervention effects on affirming reading motivations, extrinsic reading motivations, undermining reading motivations, combined motivations, and reading comprehension. The 39 studies in the meta-analysis included 55 experimental comparisons targeting affirming motivations, 12 targeting extrinsic motivations, eight targeting undermining motivations, five targeting combined motivations, and 39 targeting reading comprehension. The interventions had small, significant positive effects on affirming motivations (Cohen's d = 0.38; SE = 0.06), extrinsic motivations (Cohen's d = 0.42; SE = 0.16), and reading comprehension (Cohen's d = 0.27; SE = 0.05), and a significant, but trivial effect on combined motivation scores (Cohen's d = 0.17; SE = 0.04). The mean effect on undermining motivations was not significant (Cohen's d = -0.01; SE = 0.07).

Subsequently, we compared effects on immediate and delayed post-tests. The time between the intervention and delayed post-test ranged from two to 28 weeks. Delayed post-test results were only reported for affirming motivations (k = 5), undermining motivations (k = 2), and reading comprehension (k = 7). For affirming motivations, a small effect was found on immediate post-tests (Cohen's d = 0.40; SE = 0.07) and a trivial effect on delayed post-tests (Cohen's d = 0.19; SE = 0.13). Effects on undermining motivations were significant on neither immediate post-tests (Cohen's d = -0.07, SE = 0.08) nor delayed post-tests (Cohen's d = -0.03, SE = 0.15). For reading comprehension, a small effect was found on immediate post-tests (Cohen's d = 0.29; SE = 0.06) and a trivial effect on delayed post-tests (Cohen's d = 0.16; SE = 0.07). Effects on immediate and delayed post-tests did not significantly differ for any of the outcomes (affirming motivations: $Q(1)$ = 2.00, p = .16; undermining motivations: $Q(1)$ = 0.05, p = .83; reading comprehension: $Q(1)$ = 1.99, p = 0.16).

Moderator Analyses

To explain variability in effect sizes, we conducted moderator analyses based on intervention, sample, study, and measurement characteristics (Research Question 2). Moderator analyses were performed for immediate post-tests on affirming reading motivations and reading comprehension only, as few studies investigated effects on delayed post-tests and on extrinsic motivations, undermining motivations, and combined motivations. The outcomes of all moderator analyses are displayed in Table 2.

Table 2. Moderator Analyses of Intervention, Sample, Study, and Measurement Characteristics

Categorical variables	Categories	k_{mot}; k_{compr}	Cohen's *d* (*SE*)		*Q*	
			Affirming motivation	Comprehension	Affirming motivation	Comprehension
Intervention characteristics						
Motivational mechanisms	Competence support					
	- Yes	31; 21	0.39 (0.08)	0.33 (0.10)	*Q*(1) = 0.07	*Q*(1) = 0.28
	- No	19; 11	0.43 (0.14)	0.26 (0.08)		
	Autonomy support					
	- Yes	17; 11	0.55 (0.12)	0.34 (0.14)	*Q*(1) = 3.72	*Q*(1) = 0.62
	- No	33; 21	0.28 (0.08)	0.22 (0.05)		
	Relatedness/social motivation					
	- Yes	21; 13	0.49 (0.09)	0.37 (0.13)	*Q*(1) = 1.71	*Q*(1) = 1.75
	- No	29; 19	0.31 (0.10)	0.19 (0.05)		
	Interest					
	- Yes	29; 16	0.51 (0.10)	0.41 (0.12)	*Q*(1) = 5.85*	*Q*(1) = 4.75*
	- No	21; 16	0.21 (0.08)	0.13 (0.04)		
	Extrinsic motivators					
	- Yes	3; 0	-0.42 (0.56)	-	*Q*(1) = 2.13	-
	- No	47; 32	0.43 (0.07)	-		
	Mastery goals					
	- Yes	20; 16	0.43 (0.12)	0.33 (0.11)	*Q*(1) = 0.28	*Q*(1) = 0.68
	- No	30; 16	0.36 (0.08)	0.22 (0.06)		

Table 2. Moderator Analyses of Intervention, Sample, Study, and Measurement Characteristics (continued)

Categorical variables	Categories	k_{mot}; k_{compr}	Cohen's *d* (*SE*)		*Q*	
			Affirming motivation	Comprehension	Affirming motivation	Comprehension
	Attributions					
	- Yes	6; 3	0.30 (0.18)	0.15 (0.12)	*Q*(1) = 0.30	*Q*(1) = 1.33
	- No	44; 29	0.41 (0.07)	0.31 (0.07)		
	Value of reading					
	- Yes	1; 0	0.53 (0.27)	-	*Q*(1) = 0.22	-
	- No	49; 32	0.40 (0.07)	-		
Skills instruction	Yes	31; 25	0.39 (0.07)	0.29 (0.07)	*Q*(1) = 0.01	*Q*(1) = 0.01
	No	19; 7	0.41 (0.17)	0.28 (0.12)		
Text genre	Narrative texts	8; 6	0.67 (0.22)	0.31 (0.12)	*Q*(3) = 5.08	*Q*(3) = 2.87
	Informational texts	18; 13	0.36 (0.12)	0.39 (0.15)		
	Narrative and informational texts	19; 11	0.27 (0.09)	0.17 (0.06)		
	Words and/or sentences	5; 2	0.75 (0.27)	0.14 (0.19)		
Provider	Researcher	14; 6	0.47 (0.19)	0.66 (0.17)	*Q*(2) = 3.21	*Q*(2) = 6.78*
	Other	35; 25	0.39 (0.08)	0.24 (0.07)		
	Unknown	1; 1	0.14 (0.13)	0.13 (0.13)		
Sample characteristics						
Educational stage	Primary education	42; 24	0.38 (0.08)	0.36 (0.09)	*Q*(1) = 0.44	*Q*(1) = 6.08*
	Secondary education	8; 8	0.50 (0.17)	0.12 (0.03)		
Reader level	Mainly typical readers	33; 20	0.37 (0.10)	0.36 (0.10)	*Q*(1) = 0.03	*Q*(1) = 5.59*
	Mainly struggling readers	17; 12	0.40 (0.08)	0.12 (0.04)		

Table 2. Moderator Analyses of Intervention, Sample, Study, and Measurement Characteristics (continued)

Categorical variables	Categories	k_{mot}; k_{compr}	Cohen's *d* (*SE*)		*Q*	
			Affirming motivation	Comprehension	Affirming motivation	Comprehension
Study characteristics						
Design	Experimental design	17; 14	0.38 (0.15)	0.19 (0.05)	*Q*(1) = 0.03	*Q*(1) = 1.59
	Quasi-experimental design	33; 18	0.41 (0.08)	0.33 (0.10)		
Control group	Business-as-usual	38; 25	0.36 (0.06)	0.26 (0.06)	*Q*(1) = 0.03	*Q*(1) = 0.63
	Part of the intervention / other intervention	12; 7	0.40 (0.22)	0.44 (0.22)		
Measurement characteristics						
Type of measurement	Test	0; 32	-	-	*Q*(2) = 91.20***	-
	Observation	6; 0	0.31 (0.47)	-		
	Self-report	43; 0	0.36 (0.06)	-		
	Teacher report	1; 0	1.53 (0.11)	-		
Standardization	Study independent measure	36; 19	0.45 (0.07)	0.27 (0.08)	*Q*(1) = 1.16	*Q*(1) = 0.11
	Developed within the context of the study	14; 13	0.23 (0.18)	0.31 (0.10)		

Continuous variables	*b* (*SE*) affirming motivation	*b* (*SE*) reading comprehension
Intervention characteristics		
Number of sessions	0.003 (0.002)	0.001 (0.001)
Total duration of the intervention	0.004 (0.002)*	0.001 (0.001)
Sample characteristics		
Percentage of boys	0.023 (0.011)*	-0.008 (0.010)

Note. *k* = number of samples.
* $p < .05$. ** $p < .01$. *** $p < .001$.

Intervention Characteristics

In the first series of moderator analyses, we analyzed the effects of intervention characteristics. Motivational mechanism was shown to influence program effects on reading motivation and reading comprehension. Interest was a significant positive moderator of affirming motivations and reading comprehension: interventions that triggered interest had larger effects on affirming motivations and reading comprehension than those that did not. No significant moderator effects were found for the other motivational mechanisms. We found no effect of the combination of motivation interventions with skills instruction: programs that focused solely on motivation were equally effective in stimulating affirming motivations and reading comprehension as programs that combined this with, for instance, reading strategy instruction. Further, intervention effects were not moderated by the type of texts used in the interventions. Interventions using narrative texts, informational texts, or sentences/words for reading were equally effective in stimulating affirming motivations and reading comprehension. Provider of the intervention proved to be a significant moderator of reading comprehension, but not of affirming reading motivations: interventions delivered by researchers had larger effects on reading comprehension than interventions delivered by others. The effects of the number of sessions and total duration were analyzed using meta-regression analysis. The number of sessions was not related to effects on affirming motivations and reading comprehension. The effect of total duration was significant for affirming motivations but not for reading comprehension. Effects on affirming motivations were larger if the total duration of the intervention was longer.

Sample Characteristics

In the second series of moderator analyses, we examined the effects of sample characteristics. Educational stage was a significant moderator of effects on reading comprehension; interventions involving primary schoolers were more effective than interventions involving secondary schoolers. Interventions involving primary and secondary schoolers were equally effective in promoting affirming reading motivations. Reading level proved to be a significant moderator of reading comprehension, but not of affirming motivations. The interventions had significantly larger effects on reading comprehension if the sample included mainly typical readers than if it included mainly struggling readers. The effect of the percentage of boys was analyzed using meta-regression analysis. The outcome was significant for affirming reading motivations, but not for reading comprehension. Effects on affirming reading motivations were larger if the share of boys in the sample was higher.

Study Characteristics

In the third series of moderator analyses, we analyzed the effects of two study characteristics: study design and type of control group. The moderator analyses did not reveal any significant effects of these variables.

Measurement Characteristics

In the fourth and final series of moderator analyses, we examined the effects of measurement characteristics. A significant effect of measurement type was found on affirming motivations, indicating that effects were largest for teacher reports, as compared to self-reports and observations. However, it should be noted that teacher reports were used in only one study. Reading comprehension was measured by tests in all studies, so no moderator analyses of measurement type on reading comprehension were conducted. Finally, effects on measurements developed within the context of the study and study-independent measures did not significantly differ.

DISCUSSION

The objectives of this meta-analysis were to investigate the effects of theory-based reading motivation interventions in school on reading motivation and reading comprehension (Research Question 1) and to examine whether effects were moderated by predefined intervention, sample, study, and measurement characteristics (Research Question 2). The results indicate that investing in reading motivation can positively affect students' reading motivation and reading comprehension. Effects on reading motivation were moderated by the motivational mechanism elicited in the intervention, the duration of the intervention, gender, and type of measurement. Interventions that aimed to trigger interest had the largest effects on affirming motivations. Further, effects were larger if the total duration of the intervention was longer and if the share of boys in the sample was higher. Finally, larger effects on affirming motivations were found on teacher reports, as compared to self-reports and observations. Effects on reading comprehension were moderated by the motivational mechanism elicited in the intervention, the provider of the intervention, educational stage, and reading level. Interventions that aimed to trigger interest had the largest effects on reading comprehension. Further, interventions delivered by researchers had larger effects than interventions delivered by others (mostly teachers). Effects on reading comprehension were significantly larger for primary schoolers than for secondary schoolers. Finally, effects were significantly larger for typical readers than for struggling readers.

The positive effects we found on reading motivation and reading comprehension largely correspond to the results of earlier meta-analyses (Guthrie et al., 2007; McBreen

& Savage, 2020; Unrau et al., 2018). Comparable to previous meta-analyses, the effects we found were mostly small but significant, although for some categories of studies average effects could range up to medium; for instance, we found a medium effect on affirming motivations of programs that trigger interest. Our outcomes thus give further support to the assumption that reading motivation can be fostered by educational interventions and that, by promoting reading motivation, students' reading achievement can be increased. Apparently, increased motivation as an outcome of program participation results in students reading more frequently, which enables them to more effectively practice their reading comprehension skills. Students might then enter a process of reciprocal causation, where increased motivation and proficiency mutually influence each other, eventually leading to long-term benefits (Morgan & Fuchs, 2007; Stanovich, 1986). Our meta-analysis provides little ground for such long-term benefits, however: follow-up effects were significant, but trivial at best. Moreover, effects on delayed post-tests were included in a limited number of studies and the time between the intervention and delayed post-tests varied strongly. More research is thus needed to draw definite conclusions about long-term effects.

Effects on reading motivation appear to depend on the type of motivation. Significant positive effects were found on affirming and extrinsic motivations. Even though extrinsic motivations were hardly emphasized in the interventions, the effect on extrinsic motivations was as large as that on affirming motivations. This may be explained by previous observations of a positive relation between intrinsic and extrinsic motivation: studies by Schaffner et al. (2013) and Troyer et al. (2018) found that students with higher intrinsic motivation often have higher extrinsic motivation as well. For intervention effects, this implies that an increase in intrinsic motivation may be paralleled by an increase in extrinsic motivation. Particularly in a school context, enhanced enjoyment of reading may, for instance, go hand in hand with an enhanced sense of its importance for students' futures. The effect on undermining motivations was not significant, suggesting that current interventions are not sufficient to decrease undermining motivations. Undermining motivations are thought to be the consequence of an accumulation of negative reading experiences throughout students' school careers and are thus likely to be persistent (Nielen et al., 2016). Guthrie et al. (2009) suggest that to decrease undermining motivations a strong structure of motivational support is necessary: a combination of various motivational mechanisms over an extended period of time may be needed to reduce undermining motivations. As only few studies examined effects on undermining motivations, additional research is needed to decide whether this assumption can be confirmed.

As we analyzed the effects of a range of reading motivation interventions, while at the same time limiting ourselves to theory-based interventions, the results provide new insights into which theory-driven motivational mechanisms are particularly effective. Moderator analyses suggest that interventions in which interest is triggered have the largest effect on affirming motivations and reading comprehension. This does not necessarily mean that other mechanisms (e.g., autonomy support or mastery goals) were ineffective. Since often multiple mechanisms were combined in one intervention, the moderator effect of interest signals that it matters whether interest is part of the package offered (for a similar interpretation, see Okkinga et al., 2018). Interest could thus be seen as one of the main determinants of a successful intervention. Providing students with reading materials that match their individual interests or devising reading activities that trigger situational interest might be seen as a precondition for motivation to arise.

Interventions with and without skills instruction were equally effective in improving reading motivation and reading comprehension. This outcome can be interpreted as indicative of the added value of motivational support for reading. The observation that motivation-only interventions yield similar effects as broad interventions do, suggests that positive intervention effects are not necessarily attributable to other elements of an intervention but can be pinpointed to motivational support. This makes our estimate of the effects of motivational support more precise than in, for instance, the previous meta-analysis by McBreen and Savage (2020). At the same time, it would be risky to conclude that motivational support alone is sufficient to raise students' level of reading comprehension. Although our moderator analysis shows that motivation-only interventions do have a positive effect on reading comprehension, such interventions are often an addition to the existing reading curriculum. Naturally, growth in reading comprehension is a consequence of regular reading education as well, although motivational support appears to strengthen this effect.

The moderator effect of gender is promising, as especially boys are often characterized by low reading motivation (Baker & Wigfield, 1999; Logan & Johnston, 2009; McKenna et al., 1995; Parson et al., 2018). Struggling readers also often have low reading motivation levels (McKenna et al., 1995; Toste et al., 2020; Vaknin-Nusbaum et al., 2018). The results of our meta-analysis indicate that reading motivation interventions are equally effective in fostering the reading motivation of struggling and typical readers. However, the effects on reading comprehension were smaller for struggling readers, suggesting that these students may need more instruction to improve their reading proficiency to the same extent as typical readers. Effects on reading comprehension were significantly larger for primary schoolers than for secondary

schoolers; for the latter students, the effect was only marginal. This may be explained by the fact that students in primary education usually make larger gains in reading skills than students in secondary education (Bloom et al., 2008). Therefore, smaller effects may be expected in secondary education. However, conclusions for secondary schoolers remain somewhat tentative, as only a small share of the interventions (20%) focused on these students. More research is needed to get more insight into effective reading promotion in secondary education.

Three other moderators had significant effects: provider of the intervention, total intervention duration, and type of measurement. Interventions delivered by researchers had larger effects on reading comprehension than interventions delivered by others (in most cases teachers), possibly because researchers paid more attention to implementing the intervention with high levels of fidelity than teachers (c.f., Edmonds et al., 2009; Okkinga et al., 2018). This result underlines the importance of thoroughly communicating program principles to those who are conducting interventions in the field (Durlak & DuPre, 2008). Effects on motivation were larger if the total duration of the intervention was longer, which indicates the importance of investing in students' reading motivation during a longer period of time. The largest effects on reading motivation were found on teacher reports. However, it should be noted that teacher reports were only used in one study, so no strong conclusion can be drawn from this outcome.

Other moderators (text genre, study design, type of control group, and whether instruments were developed within the context of the study or not) showed no significant effects. The fact that positive effects were observed in studies with a strong design and on study-independent measures as well further substantiates our conclusions that reading motivation interventions can positively influence students' reading motivation and reading comprehension.

Limitations and Future Research

When interpreting the results of this meta-analysis, some limitations should be considered. We examined the effects of theory-based motivational mechanisms on reading motivation and reading comprehension. In many interventions, a combination of these mechanisms was applied. The sample of studies in the meta-analysis was not large enough to test the effects of all combinations. Therefore, we tested whether interventions in which certain mechanisms were triggered had larger effects on reading motivation or reading comprehension than interventions in which these mechanisms were not triggered. Future studies may reveal whether certain combinations of motivational mechanisms are more effective than other combinations.

We aimed to identify which theoretical mechanisms contribute to the promotion of reading motivation and comprehension, thereby providing better insights into the effective ingredients of motivational interventions. Therefore, we only included theory-based interventions. Notwithstanding this strict inclusion criterion, we observed that, in several studies, the theoretical framework, the motivational mechanisms elicited, and the outcome variables did not always fully correspond. In future studies, researchers should thus be more precise in aligning the design of their interventions and the selection of measures with the theoretical model they choose to start from.

In conducting the moderator-analyses, we followed the analog-to-the-ANOVA procedure (Lipsey & Wilson, 2001), which is common practice in meta-analyses. However, some moderators likely overlap. For instance, interventions focusing on both motivation and skills instruction were often longer than interventions only focusing on motivation. Such confounding could be reduced by combining moderators in one analysis. However, such an analysis would require a larger set of studies than available in the present meta-analysis.

A limitation in many studies is that they did not examine treatment fidelity. Despite its importance in interpreting intervention effects (Durlak & DuPre, 2008), we found that slightly more than half of the studies reported on implementation. The moderator effect of provider of the intervention suggests that implementation quality was a factor in the interventions we examined. This outcome stresses the need for attention to monitoring program implementation in practice and research.

Conclusion and Implications

We conclude that there is an effect of motivational interventions on both reading motivation and reading comprehension. Our meta-analysis thereby contributes to the debate about the direction of the association between motivation and achievement (Aunola et al., 2002; Becker et al., 2010; Schiefele et al., 2016): our outcomes provide ground for the hypothesis that reading motivation affects reading proficiency, either independently or as part of a process of reciprocal causation. This, in turn, suggests that motivational support should be part of a model of reading instruction (Duke et al., 2011; Duke & Cartwright, 2021).

The results of our meta-analysis also provide information on what are the most effective ingredients of reading motivation interventions. Interventions that aimed to trigger students' interest had the largest effects on reading motivation and reading comprehension. This outcome can inform teachers who are committed to furthering their students' reading development, developers of educational methods, and those

who make decisions about curricula for reading education. It seems particularly important to trigger students' interest, for example by matching texts to students' interests or by making real-world connections.

At the same time, our meta-analysis provides an impetus for further research. We are in need of studies that examine whether positive effects are sustained over time. Further, studies should take into account implementation quality and provide information on how to best support teachers in implementing motivational mechanisms. Finally, future studies should not only examine how to promote affirming motivations but also to decrease undermining motivations.

3

PERSONALIZED EXPERT GUIDANCE OF STUDENTS' BOOK CHOICES IN PRIMARY AND SECONDARY EDUCATION

This chapter is based on:

Van der Sande, L., Wildeman, I., Bus, A. G., & Van Steensel, R. (2022). Personalized expert guidance of students' book choices in primary and secondary education. *Reading Psychology, 43*(5-6), 380-404. http://doi.org/10.1080/02702711.2022.2113944

ABSTRACT

In many schools, independent silent reading of self-selected books is used to promote reading. However, self-selection may be insufficient to counter negative reading experiences, particularly when students choose books not attuned to their reading level and interest. Two studies experimentally tested whether personalized expert guidance when selecting books could prevent a reading attitude decline. Study 1 focused on readers in prevocational secondary education (Grade 7 and 8; $N = 136$). Study 2 included younger readers from primary education (Grade 4-6, $N = 99$). Students in the experimental condition met with a librarian to discuss book choices every two weeks for three months. In both studies, the intervention stabilized the reading attitude decline, although, in Study 1, only for more advanced readers. In Study 2, reading comprehension of the most proficient readers also improved. This indicates that guidance in selecting books can preserve students' reading attitude and increase reading proficiency growth.

Keywords: independent silent reading, reading attitude, reading comprehension, book choice, guidance

In the upper half of primary school, students' interest in reading books and other long stretches of text begins to decline—a decline that continues into secondary education (e.g., Gottfried et al., 2001; Gunobgunob-Mirsasol, 2020; Kelley & Decker, 2009; McKenna et al., 1995; McKenna et al., 2012). Reading attitude declines and growth in achievement levels off, especially for students from age 10 to 15 (e.g., Mullis et al., 2012). These effects, referred to by Chall as the 'fourth-grade slump' (Chall & Jacobs, 2003), can result from frustrating reading experiences that often occur in this stage of reading development. Unlike the first three years of education, in which students read simple texts about familiar topics, by Grade 4, students read more varied, complex, and linguistically and cognitively challenging texts. Texts may contain words that are hard to decode as well as new words and ideas beyond students' current repertoire and knowledge of the world. Reading texts that are not fine-tuned to students' abilities and interests without sufficient guidance from teachers while reading the texts may trigger negative reading experiences that can explain the decline in reading attitude and skills (Locher et al., 2019; Snow & Moje, 2010).

To promote sufficient practice in reading, understanding, and learning from increasingly demanding texts, many Dutch schools have enriched their school libraries (Nielen & Bus, 2015) and schedule Independent Silent Reading (ISR) time in which students independently read self-selected books (Garan & DeVoogd, 2008; Krashen, 2006; Manning et al., 2010). Although the impact of such ways of increasing reading time seems evident, research so far has failed to prove the efficacy of scheduling time for reading (e.g., NRP, 2000, Yoon, 2002). To explain this lack of effects, we hypothesize that, contrary to what is commonly assumed, ISR in schools can easily become a source of negative experiences, particularly when students are expected to self-select books. Self-selection is an important element of ISR because it is assumed to trigger a sense of autonomy that enhances reading motivation (Krashen & McQuillan, 2007; Ryan & Deci, 2000). However, research has shown that many students struggle to select books that match their skills and interests, thus causing negative reading experiences (c.f., Kragler, 2000; Merga & Roni, 2017; Merga, 2018).

Especially particular subsamples, such as students growing up in less literate families, are in danger of selecting books that do not fit their skills and interests, making them particularly prone to negative experiences during ISR (Strommen & Mates, 2004). These students are less inclined to talk about books with their parents or to visit libraries and bookstores (Baker, 2003; Kraaykamp, 2003). Therefore, they may be less familiar with book titles, which can result in difficulties in finding appropriate books, despite the presence of varied reading materials in school (Hibbard & Franklin, 2015; Mackey, 2014). When choosing books for ISR, these students may rely on superficial

selection strategies, based, for example, on physical features such as cover or length, and, consequently, do not succeed in finding books that are attuned to their skills and interests (Hopper, 2005; Merga, 2016; Merga & Roni, 2017; Mohr, 2006). Reading texts during ISR can then become a frustrating endeavour, resulting in discouraging reading experiences, and leading to a decreased reading attitude (Locher, 2019).

Assuming that an accumulation of negative experiences with reading could partly explain the decline in reading attitude from Grade 4 onward, we may be able to reduce the decrease in attitude by taking away one of the main barriers for positive reading practice: finding books that match students' skills and interests (Fulmer & Frijters, 2011; Locher, 2019; Margolis & McCabe, 2003). We hypothesize that helping students find appropriate books can turn ISR into a mainly positive experience and reduce the reading attitude decline. We additionally expect that such a favorable change could encourage a virtuous cycle: as a result of positive reading experiences, students' reading attitude improves, which, in turn, may expand reading activities, leading to a growth in familiarity with book titles and better reading proficiency. We may thus also prevent additional emotional barriers for new text reading attempts (Bishop, 2009; Nielen et al., 2016).

Several studies experimented with ways to provide additional support in choosing books during ISR (Kelley & Clausen Grace, 2006; Reutzel et al., 2008; Weber, 2018; Wutz & Wedwick, 2005). This support took various forms. For instance, in *Scaffolded Silent Reading* teachers guide students' book selection by arranging the library to find books on their reading level more easily and teach students selection strategies (Reutzel et al., 2008). In R^5 (read, relax, reflect, respond, rap), teachers log students' book choices and, depending on their progress in reading, support those students who seem to have trouble finding appropriate books (Kelley & Clausen Grace, 2006). In BOOKMATCH (Wutz & Wedwick, 2005), students fill out a book selection form to decide whether the book they just selected is appropriate. All studies indicated that guidance is effective in promoting students' reading attitude and proficiency. Still, in all cases, students themselves were left responsible for finding appropriate books. Even though this may have improved their book selection, it may not have resulted in the most optimal prevention of negative reading experiences.

In this study, we built on such interventions. To be sure that the support is fine-tuned to students' reading skills and interests, we involved experts in children's literature—librarians—to help students select books. We expected this support would increase the chance that students have optimal reading experiences that would benefit their reading attitude, familiarity with book titles, and reading achievement.

The Current Study

Assuming that reading books not fitting students' skills and interests causes negative reading experiences (Fulmer & Frijters, 2011; Locher, 2019; Margolis & McCabe, 2003), we examine whether personalized guidance in book selection reduces the reading attitude decline and furthers students' reading development. Students met with a librarian in biweekly meetings to discuss their experiences with the book they were currently reading or had just finished and to receive suggestions for a new book attuned to students' reading level and interests.

We aimed to answer the following research questions:

1. Does personalized expert guidance in selecting books for ISR influence students' reading attitude, and, consequently, their familiarity with book titles and reading comprehension?
2. Do the effects of book selection guidance vary with students' initial levels of reading attitude, familiarity with book titles, and reading comprehension?

We expected that more reluctant readers would benefit more than typical readers from expert guidance because particularly those readers have problems selecting books matching their reading level and interests (Hairrell et al., 2010; Kragler, 2000; Merga, 2019).

STUDY 1: SUPPORTING BOOK CHOICES IN PREVOCATIONAL SECONDARY EDUCATION

Study 1 focused on students in Grade 7 and 8 of prevocational education, the lowest Dutch secondary education level. Because students in prevocational education mostly have a low reading proficiency (Feskens et al., 2016) and limited interest in reading (DUO Onderwijsonderzoek, 2017), they may benefit from guidance in selecting appropriate books for ISR (Hairrell et al., 2010; Merga, 2019).

METHOD

Design

Stratified for school, we randomly assigned each participant to the experimental or control condition. Students in the experimental condition met with a librarian every two weeks to discuss the selection of a new book while the control group self-selected books for reading during ISR. Pre- and posttests included group-wise administration of questionnaires evaluating reading attitude and familiarity with book titles and a reading comprehension test.

Participants

The sample included 82 Grade 7 students and 54 Grade 8 students, and more girls (n = 78) than boys (n = 58). The participants' average age was 13.42 years (SD = 0.82; range: 11.83-15.18). In all six schools (14 classes), the libraries were well-equipped and schools offered ISR on average for 35 minutes per week. The number of students willing to participate in the intervention ranged per school from 9-33. Because the librarians of the public library, employed at the school for a few hours per week, normally were mainly responsible for managing and updating the school library collection, each librarian had only limited time available and could guide a maximum of ten students. Consequently, the control group (n = 83) was larger than the experimental group (n = 53).

Intervention

Individual meetings between students and librarians took place on school days, each meeting lasting approximately ten minutes. To structure the conversations, the researchers provided a checklist with questions about the book that the student was currently reading, such as "Do you like the book?" and "Do you find the book easy or difficult?" (see Appendix 3 for the complete checklist). Guided by students' responses, librarians suggested one or more new books attuned to students' reading level and interests. Librarians were careful to maintain students' sense of autonomy by presenting their advice as a suggestion and not as a prescription, as this may be counterproductive and reduce motivation (Merga & Roni, 2017; Ryan & Deci, 2000).

Measures

Reading Attitude

The Reading Attitude Scale (Aarnoutse, 1990) contained 27 questions with a yes or no answer, among which: "Do you often read in leisure time?" and "Do you find reading boring?". After recoding negatively formulated items, we calculated a sum score (Cronbach's α pretest = .93, posttest = .94). In previous studies, scores on the Reading Attitude Scale were found to be significantly correlated with scores on a title recognition list and reading comprehension (Nielen & Bus, 2015). Research also shows that reluctant readers, unfamiliar with age-appropriate book titles, had significantly lower scores on this questionnaire than enthusiastic readers (Nielen et al., 2016).

Title Recognition

A title recognition list containing 34 titles of existing children's books, mixed with 16 fake titles, was used to assess familiarity with books (Stanovich & West, 1989). To account for varying reading levels, the list included books appropriate for students in primary education (9-12 years) and books for adolescents. Students checked the

titles they knew and students' scores were the percentage of (correctly) checked existing titles minus the percentage of (incorrectly) checked fake titles. To prevent a testing effect, we developed two versions (A and B). Half of the students received version A at pretest and version B at posttest and half vice versa. Both versions had acceptable reliabilities (Cronbach's α version A: pretest = .83, posttest = .76, version B: pretest = .88, posttest = .85). Version B appeared to include significantly fewer well-known books than version A, $t(133) = -2.20$, $p = .030$. Therefore, pretest and posttest scores on version B were increased with the difference between the average scores on version A and B at pretest (4.36), so that the mean of both versions at pretest was the same.

Reading Comprehension

To assess reading comprehension, we used the 'SALT-Reading' consisting of factual and inferential comprehension questions about brief texts varying in genre (narrative, expository, argumentative, instructive; Van Steensel et al., 2013). To prevent a testing effect, we divided the test into two parts, each containing 37 questions. Each version contained multiple-choice questions and open-ended questions (respectively seven and four in version A and B). Answers to the open-ended questions were double-coded by two independent coders. Two items had low inter-rater reliability and were not used for calculating total scores. Total scores were the percentage of questions answered correctly (Cronbach's α version A: pretest = .80, posttest = .82, version B: pretest = .83, posttest = .81). Because the scores on both versions significantly differed, $t(102) = -4.71$, $p < .001$, we added 15.40 (the difference between the two averages at pretest) to pretest and posttest scores on version A so that both versions had the same mean at pretest.

Procedure

The faculty's Ethical Review Board approved the study. In the school year 2017-2018, six schools and their part-time librarians agreed to participate. Students were encouraged to participate by the possibility of winning a cinema ticket raffled among the participants in each school. The students' parents received information about the study and a form that enabled them to refuse their child's participation. Both the questionnaire and the reading comprehension test were administered to entire classes in 50-minute class sessions. The sessions were introduced by the second author or a trained research assistant, and teachers were present to maintain order. At the start, librarians received instruction by phone about the checklist. Halfway through the intervention, we contacted them again to monitor implementation and hear their experiences. Based on the completed checklists, we collected information about the number of meetings and the number of selected books.

Data-analysis

As the data were hierarchically structured (students in classes in schools), we used Huber-White corrections of standard errors to account for this dependency. Using the Complex Sample General Linear Model (CSGLM) in SPSS, reading attitude, title recognition, and reading comprehension were regressed on pretest scores, gender, reading comprehension at pretest, condition (experimental vs. control), and interactions between the covariates and condition. We entered reading comprehension at pretest and the interaction of reading comprehension at pretest × condition in all analyses because the intervention's effectiveness might depend on students' reading level.

Missing items on reading comprehension were considered incorrect. Following the SALT-Reading procedures (Van Steensel et al., 2013), we coded the test as missing if more than three consecutive items were lacking. Missing items on reading attitude and title recognition were imputed using the EM-procedure in SPSS. Students with missing scores on an entire test or questionnaire were excluded from the analysis. For analyses of reading attitude, title recognition, and reading comprehension, the groups included 95, 95, and 88 students.

The analyses concerned the intent-to-treat group. As four experimental students did not have any meetings with their librarian, we also conducted the analyses without these students.

RESULTS

Implementation

The students had zero (n = 4), three (n = 7), four (n = 8), five (n = 15), or six meetings (n = 19) with the librarian. According to the librarians, especially struggling readers had difficulties talking about books they enjoyed, which made it hard to suggest books. One librarian believed that these students need more meetings to make the intervention work. Librarians mostly selected a few books they considered appropriate, from which students made their choice. The number of books read during the intervention period ranged from zero to seven (M = 3.35; SD = 1.56). Sometimes no new books were advised because students had not yet finished their current book. Fourteen students (28.6%) selected a maximum of two new books. The number of books was related to students' scores on the reading comprehension test: the 50 percent highest-scoring students selected on average 4.06 new books, while the 50 percent lowest-scoring students selected 3.05 new books, $t(28) = -1.92$, $p = .033$ (one-sided).

Reading Attitude

At pretest, experimental and control students did not significantly differ in reading attitude, $t(133) = 0.65$, $p = .515$. Posttest scores for reading attitude were lower than pretest scores (see Table 1), indicating that reading attitude declined. Reading attitude at pretest was a significant predictor of reading attitude at posttest (Table 2). Although there was no significant main effect of the intervention, there was a significant interaction effect of intervention × reading level at pretest. Students who scored relatively high on reading comprehension (pretest) benefitted from the intervention and outperformed the control group, while students with relatively low scores on reading comprehension lagged behind the control group (Figure 1). The intervention effect for students with high reading comprehension scores at pretest equaled Cohen's $d = 0.25$.

Table 1. Means, Standard Deviations, and Correlations on Reading Attitude, Title Recognition, and Reading Comprehension in Grades 7 and 8 (N_{total} = 104-135; $N_{experimental\ group}$ = 40-53; $N_{control\ group}$ = 64-82)

	Total sample	Experimental group	Control group	1	2	3	4	5	6
	M (*SD*)	*M* (*SD*)	*M* (*SD*)						
Pretest									
1. Reading attitude	11.51 (7.65)	10.97 (7.85)	11.85 (7.55)	-					
2. Title recognition	11.87 (11.48)	11.27 (13.63)	12.26 (9.91)	-.02	-				
3. Reading comprehension	64.20 (16.60)	63.07 (17.49)	64.91 (16.11)	.28**	.35***	-			
Posttest									
4. Reading attitude	11.25 (8.02)	11.16 (8.57)	11.30 (7.74)	.78***	-.06	.31**	-		
5. Title recognition	13.33 (11.46)	12.05 (14.02)	14.07 (9.71)	.08	.48***	.37***	.06	-	
6. Reading comprehension	66.58 (17.01)	62.33 (16.83)	69.13 (16.17)	.37***	.25**	.69***	.41***	.36***	-

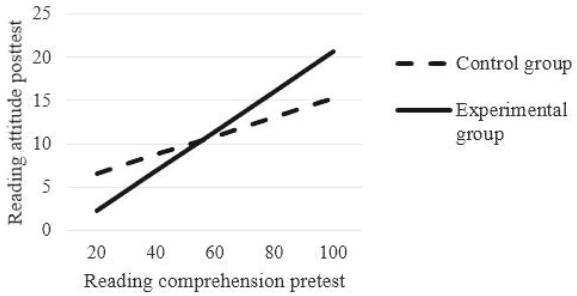
** $p < .01$. *** $p < .001$.

Table 2. Results of Regressing Reading Attitude, Title Recognition, and Reading Comprehension on Pretest Scores, Reading Comprehension, Gender, and Experimental Condition in Grades 7 and 8

Parameter	Reading attitude	Title recognition	Reading comprehension
Intercept	10.90 (0.94)	12.11 (2.44)	64.74 (2.82)
Pretest score	0.82 (0.09)***	0.30 (0.12) *	0.79 (0.12)***
Reading comprehension	-0.04 (0.05)	0.17 (0.08)	
Gender (0 = boy)	-0.71 (1.24)	4.58 (2.95)	6.02 (2.72)*
Condition (0 = control group)	-1.99 (1.85)	-1.51 (3.87)	-2.18 (3.23)
Pretest × condition	-0.18 (0.13)	0.07 (0.25)	-0.07 (0.15)
Reading comprehension × condition	0.18 (0.06)**	0.07 (0.13)	
Gender × condition	4.65 (2.33)	-1.88 (4.91)	-6.99 (3.75)

Note. Standard errors are presented in parentheses.
*$p < .05$. **$p < .01$. ***$p < .001$.

Figure 1. Interaction Effect of Reading Comprehension Pretest Scores and Experimental Condition on Reading Attitude



Title Recognition

At pretest, experimental and control students did not significantly differ on the title recognition list, $t(133) = 0.54$, $p = .588$. Students' pretest scores significantly predicted their posttest scores (Table 2). Neither the main effect of the intervention nor the interactions of the covariates and the intervention were significant.

Reading comprehension

At pretest, experimental and control students did not significantly differ in reading comprehension, $t(102) = 0.55$, $p = .586$. In addition to an effect of pretest scores on reading comprehension, there was an effect of gender (Table 2): girls outperformed boys. Condition had no significant effect on reading comprehension. Additionally, the interactions of the covariates and condition were not significant.

Additional Analyses

Four students in the experimental condition did not have any meetings with the librarians. Excluding these students from the analyses did not change the outcomes.

DISCUSSION

In prevocational secondary education, personalized expert guidance diminished the decrease in reading attitude that was apparent in the sample as a whole, although not all students benefited. Personalized guidance of book selection positively affected reading attitude compared to self-selection of books. However, contrary to our expectation that particularly struggling readers would benefit from guidance in selecting books, the effect on reading attitude was limited to students who were relatively advanced in reading. Possibly, the poor reading skills of struggling readers precluded an initial interest in reading (Soemer & Schiefele, 2018; Spichtig et al., 2017) and thus hampered the implementation of the intervention. This hypothesis is supported by the observation that the least proficient readers only read few books during the intervention, while more proficient readers were able to read more books in the intervention period. Consequently, the proficient readers likely had more meaningful discussions with the librarians, thus receiving more guidance in selecting new books. This study did not reveal any effects of the intervention on the more distal measures of familiarity with book titles and reading comprehension.

STUDY 2: SUPPORTING BOOK CHOICES IN PRIMARY EDUCATION

Study 2 allows testing the intervention's impact when students read more books because more time is available for ISR. In all participating primary schools, ISR took place daily. We focused on students in Grades 4 to 6 because, for many students, this period marks the onset of the decline in reading attitude and proficiency (Chall & Jacobs, 2003; Gottfried et al., 2001; McKenna et al., 1995).

METHOD

Design

In each school, an equal number of students was randomly assigned to the experimental or the control group, stratified for grade and gender. Before and after the three-month intervention period, students filled out questionnaires to assess their reading attitude and title recognition; they also completed a reading comprehension test.

Participants

112 students from 27 classes in nine schools participated. In similar schools, on average 99 minutes per week were reserved for ISR (Van der Sande et al., 2019). Due to the limited time availability of librarians, we had to constrain the number of participants per school, ranging from 10 to 15. One school dropped out because the librarian did not have any meetings with the students. Hence, the final sample consisted of 99 students from eight schools (experimental group: *n* = 49; control group: *n* = 50), of whom 40 were in Grade 4, 36 in Grade 5, and 23 in Grade 6. On average, students were 10.41 years old (*SD* = 0.87; range: 8.79-12.37) and the sample included about as many boys (n = 50) as girls (n = 49).

Intervention

The intervention was the same as in Study 1: Students in the experimental condition met once every two weeks with a librarian to discuss new books while students in the control group self-selected books.

Measures

Reading Attitude

The Picture Evaluation Task (Nielen et al., 2018) was used as indicator of students' reading attitude. Students rated 24 pictures and 16 Dutch words on a 6-point Likert-scale, ranging from 1 (*not attractive at all*) to 6 (*very attractive*). Half of the pictures and words were related to reading, while the other half were neutral. The reading and neutral pictures were matched on the color and size of the objects and in depicting people or animals (Figure 2). The reading and neutral words had a similar length (e.g., 'book' and 'door'). The average score on the neutral items (Cronbach's α pretest = .81, posttest = .86) was subtracted from the average score on the reading items (Cronbach's α pretest = .94, posttest = .96). A validation study, including over 1200 students, showed that readers from Grades 4 to 8 rarely reading books scored significantly lower on this measure than students regularly reading books (Nielen et al., 2016).

Figure 2. Example of a Reading Picture and Matched Neutral Picture in the Picture Evaluation Task

Title Recognition

We used a title recognition list as an indicator of familiarity with books (see Study 1). To prevent a testing effect, we developed two versions. Half of the students made version A at pretest and version B at posttest and the other half vice versa. Both contained 34 existing titles, appropriate for the students' age range, and 16 fake titles (Cronbach's α version A: pretest = .87, posttest = .84, version B: pretest = .84, posttest = .81). The difference between the two versions at pretest indicated that version A included fewer well-known books than version B, $t(92) = 2.12$, $p = .037$. We added the average difference between version A and B at pretest (6.91) to the pretest and posttest scores on version A, so that both versions had the same mean at pretest.

Reading Comprehension

We used a standardized reading comprehension test (De Vos, 2011), containing multiple-choice questions about short, age-appropriate texts. The questions concern inferencing (e.g., deriving word meanings), integration of information (e.g., stating the main idea of a text), and comprehension of text structure (e.g., placing events in chronological order). To prevent a testing effect, we divided the test into two parts (version A and B). Both versions were comparable in the amount of text and the number of questions asked, ranging from 17 to 21. Total scores were based on the percentage of questions answered correctly (Cronbach's α pretest = .69 and posttest = .68). The average scores on version A and B differed for none of the grades, indicating equal difficulty.

Procedure

The study, conducted in the school year 2017-2018, was approved by the faculty's Ethical Review Board. Nine schools and their librarians agreed to participate. Parents were asked for their informed consent. The reading attitude questionnaire, title recognition list, and reading comprehension test were administered groupwise. After a brief instruction by the first author or a trained research assistant, students completed the questionnaires and test while teachers were present to maintain order. It took students about 60 minutes to complete all instruments. Halfway through the intervention, we contacted the librarians to monitor implementation.

Data-analysis

We used the same procedure as in Study 1 to answer the research questions. Using CSGLM with Huber-White corrections for school, reading attitude, title recognition, and reading comprehension were regressed on pretest scores, gender, reading comprehension at pretest, condition (experimental vs. control), and interactions between the covariates and condition.

For missing items on reading attitude and title recognition, we used the EM-procedure in SPSS. Students with missing scores on the comprehension test or a questionnaire were excluded from the specific analysis. Analyses targeting reading attitude, title recognition, and reading comprehension included 92, 92, and 94 students.

RESULTS

Implementation

The students had four (n = 4), five (n = 28) or six meetings (n = 17) with the librarians. The librarians' reports were mainly positive: most students liked to talk about their books. The librarians noticed large differences in reading level and interest, which, they suggested, highlights the importance of personalized guidance. Some students were inclined to read the same books as their classmates, even though these books were too hard for them. The meetings with the librarians helped these students realize which books were more appropriate and to select better matching books. One librarian, however, mentioned that two of her students, reluctant readers, did not like to talk about books and were less open to advice. The number of selected books during the intervention period (M = 4.35; SD = 1.84) was not dependent on students' reading proficiency. The number of students who selected a maximum of two new books (n = 5; 10.2%) was lower than in prevocational secondary education (28.6%).

Reading Attitude

At pretest, students in the experimental and control group did not significantly differ in reading attitude, $t(92) = -0.57$, $p = .570$. Reading attitude at posttest was lower than at pretest (see Table 3), indicating that, on average, students' reading attitude decreased. Regression analysis revealed significant main effects of pretest scores and gender on reading attitude at posttest. Girls had a more positive reading attitude than boys. The condition effect was significant and positive (Cohen's d = 0.44): experimental students had a more positive reading attitude than control students (Table 4). The positive interaction between pretest and condition indicated that students who had a more positive reading attitude at pretest benefited more from the intervention than students with a less positive attitude (Figure 3).

Table 3. Means, Standard Deviations, and Correlations on Reading Attitude, Title Recognition, and Reading Comprehension in Grades 4 to 6 (N_{total} = 48-49; $N_{experimental\ group}$ = 45-49; $N_{control\ group}$ = 94-97)

	Total sample	Experimental group	Control group	1	2	3	4	5	6
	M (*SD*)	*M* (*SD*)	*M* (*SD*)						
Pretest									
1. Reading attitude	0.50 (0.97)	0.55 (0.99)	0.44 (0.96)	-					
2. Title recognition	21.46 (15.72)	21.50 (15.76)	21.42 (15.85)	.15	-				
3. Reading comprehension	66.35 (18.81)	66.71 (19.69)	65.97 (18.05)	.29**	.35***	-			
Posttest									
4. Reading attitude	0.38 (1.04)	0.51 (1.16)	0.25 (0.89)	.77***	.04	.31**	-		
5. Title recognition	25.02 (14.26)	24.91 (14.60)	25.12 (14.05)	.31**	.45***	.28**	.13	-	
6. Reading comprehension	68.05 (18.58)	66.23 (21.02)	69.87 (15.78)	.23*	.30**	.42***	.25*	.22*	-

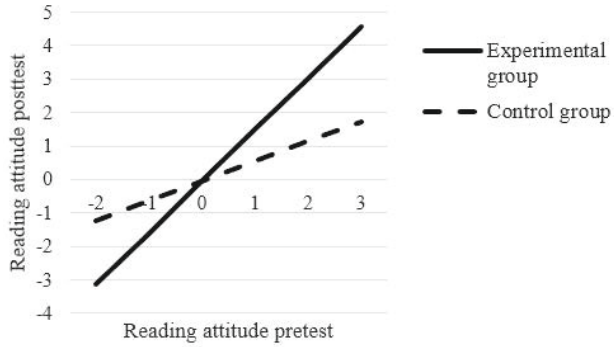
* p < .05. ** p < .01. *** p < .001.

Table 4. Results of Regressing Reading Attitude, Title Recognition, and Reading Comprehension on Pretest Scores, Reading Comprehension, Gender, and Experimental Condition in Grades 4 to 6

Parameter	Reading attitude	Title recognition	Reading comprehension
Intercept	0.42 (0.14)	26.61 (2.61)	66.36 (2.13)
Pretest score	0.48 (0.07)***	0.35 (0.14)*	0.09 (0.11)
Reading comprehension	0.01 (0.01)	0.09 (0.08)	
Gender (0 = boy)	0.44 (0.13)*	-2.73 (4.25)	9.79 (1.87)***
Condition (0 = control group)	0.46 (0.19)*	-3.55 (2.16)	0.75 (2.34)
Pretest × condition	0.47 (0.15)*	0.11 (0.23)	0.58 (0.17)*
Reading comprehension × condition	0.00 (0.01)	-0.05 (0.13)	
Gender × condition	-0.54 (0.32)	6.83 (4.95)	-11.94 (3.08)**

Note. Standard errors are presented in parentheses.
*$p < .05$. **$p < .01$. ***$p < .001$.

Figure 3. Interaction Effect of Reading Attitude Pretest Scores and Experimental Condition on Reading Attitude



Title Recognition

At pretest, students in the experimental and control group did not significantly differ in title recognition, $t(92) = -0.03$, $p = .977$. Apart from a positive effect of pretest scores on title recognition at posttest, none of the main effects or interactions between condition and covariates were significant (Table 4).

Reading Comprehension

At pretest, students in the experimental and control group did not significantly differ in reading comprehension, $t(94) = -0.19$, $p = .849$. The regression revealed a main effect

of gender (Table 4): girls outperformed boys. The intervention did not have a main effect on reading comprehension, but there were significant interaction effects. The interaction of reading comprehension pretest scores and condition was positive. Only students who scored high on reading comprehension at pretest benefitted from the intervention, while students who scored low did not. The negative interaction effect of gender and condition indicates a negative effect on reading comprehension for girls, but not for boys.

DISCUSSION

Students' reading attitude declined from pretest to posttest, but there was less decline with personalized guidance. Students who had a more positive reading attitude at the start benefited most from the intervention. Likewise, personalized guidance improved reading comprehension, but only for more proficient readers. The findings suggest that personalized guidance in selecting books, more than complete autonomy, can reduce the decline in reading attitude and, as a result, promote reading development. There is no obvious explanation for the finding that the intervention harmed reading comprehension for girls. There was no support for the assumption that students read more often due to the intervention, thereby increasing their familiarity with books.

GENERAL DISCUSSION

Our study indicates that prevention of negative reading experiences by supporting book selection can reduce the declining interest in reading that is often visible in students from Grade 4 onward. In both Study 1 and 2, guiding students in finding appropriate books for ISR affected reading attitude: without guidance, reading attitude decreased, but attitude stabilized when students received support in book selection. Thus, for students in the upper half of primary school and beyond, ISR without measures that guarantee positive reading experiences may be insufficient to promote reading (Kelley & Clausen Grace, 2006; Reutzel et al., 2008).

The interaction effects between pretest scores and condition revealed that more advanced students benefited most from guidance in selecting books. The most plausible reason for this is that these students received more substantial support, simply because they read more books: advanced readers were ready to start a new book more often than reluctant readers, making their meetings with the librarian more meaningful. Additionally, an initial positive attitude toward reading likely made these students more susceptible to the librarians' advice. Particularly for students with reading deficits—struggling readers in prevocational education—guidance appeared to

have no effects. As ISR formed a minor part in the prevocational education curriculum, these students read only a few books during the intervention period. Consequently, the intervention likely had too little substance. The librarians' comments corroborate this conclusion: they suggested that a longer intervention period might be necessary for this group of students.

Of the effects we found, those on reading attitude were most pronounced, and they occurred in both age groups. Only the younger students improved in reading comprehension. Within this group, the more advanced students showed progress in reading proficiency, probably because this group was the only one with enough practice during the intervention to enable progress. Neither of the two studies revealed effects on familiarity with book titles, probably because this instrument was not sensitive enough to assess expanding reading activity in the short term.

Theoretical Implications

A phenomenon that is known as the fourth-grade slump, already signaled halfway through the twentieth century (Hildreth, 1947; Chall & Jacobs, 2003), continues to be valid: when students have passed the initial stages of reading acquisition and their reading development becomes increasingly dependent on their self-initiated reading activities, their reading attitude tends to decline and their reading proficiency levels off (Nielen, 2016; Snow & Moje, 2010). Investments in the availability of books in schools and the increased time reserved for ISR alone do not counter this negative trend.

Krashen's (2006) theory that students' reading development is promoted by increased practice appears to be corroborated: if we succeed in making students practice reading without experiencing frustration, this promotes students' reading attitude and, due to more practice, their reading proficiency. Krashen's assumption that this mechanism is elicited by simply providing access to books and encouraging autonomous reading was not supported: without an intervention that removes important barriers for practicing reading, such as inappropriate book choices, students' reading attitude declined. Our findings, in other words, suggest a conditional effect of ISR on reading development, which may explain the heterogeneous results that are found in studies on ISR effects (e.g., NRP, 2000; Yoon, 2002).

Our finding of a negative overall trend in reading attitude supports the hypothesis that students are prone to have negative reading experiences (Locher, 2019; Nielen et al., 2016). Our findings corroborate the theory that negative experiences are caused by widespread problems such as students' failure to select books that match their interests and reading level (Kragler, 2000; Merga, 2016, 2018; Merga & Roni, 2017). We

assume that when this often happens and negative reading experiences build up, their reading attitude decreases, which may likely level off students' reading development. If such frustrating experiences accumulate over several years, students may even develop an emotional resistance toward reading (Nielen et al., 2016).

The current findings also indicate that it is possible to give reading development a positive spin and ensure that students have more positive reading experiences which may stimulate an upward-moving reading cycle, leading to a more positive reading attitude, more practice, and higher reading proficiency (Mol & Bus, 2011; Snow & Moje; Stanovich, 1986). A small and rather inexpensive intervention involving incidental personal guidance in choosing books appeared to enhance students' reading development. We could show that personalized support in book selection has positive consequences for reading attitude and, to some extent, for reading achievement.

Limitations and Future Research

It appears that our intervention was too short to be able to identify effects on title recognition. On average, students were not able to read more than three to four books in total. We might have found more effects on title recognition if we had, for instance, expanded the intervention period from three to six months (Krashen, 2001).

We did not study whether students' book choices aligned with the librarians' suggestions or students' satisfaction with these books. Assessment of their reading behavior (concentration, distraction) would have been a useful supplement to ascertain their positive reading experiences. Furthermore, the intervention effects may not be fully attributable to the quality of the librarians' advice but also to the fact that students have a chance to discuss books with a more knowledgeable other. For a critical test of this hypothesis, we would need an additional experimental condition: discussing books without the intention to advise new books.

The RCTs were not designed to test the effects of the number of sessions, quality of the meetings, and students' satisfaction with the librarians' recommendations, and we could thus not explore correlations between these variables and the outcome measures. As a source for new hypotheses it might be interesting to explore such correlations or even systematically test variability in implementation and outcome measures, for instance by assessing the effects of different dosages of the intervention.

Finally, there was a substantial difference in the time scheduled by schools for ISR: about half an hour per week in Study 1 and about 100 minutes per week in Study 2, which may additionally explain the minor effects in Study 1. To provide a stronger

test for the hypothesis that personalized support is effective for older students in prevocational education, more effort should be made to increase reading time in future studies.

CONCLUSION

We conclude that simply providing time for independent reading at school does not stop the decrease in students' reading attitude in the upper half of primary school and beyond. Guiding students' book selection appears to counter students' waning interest in reading and promote their further reading development, although no effects were found for struggling readers in prevocational secondary education. The guidance that contributes to an optimal match between student and book likely leads to an accumulation of positive book reading experiences. We found that a small-scale but well-chosen intervention substantially impacts students' reading: the intervention, including at most six ten-minute meetings spread over three months, proved beneficial for reading attitude and reading achievement. We employed librarians to help students find appropriate books and personalize book choices. It might be possible to achieve the same with digital technology: by using reading analytics, it may be possible to monitor students' book choices and subsequent reading behavior. Connecting such diagnostics with databases of children's and youth literature might guide the selection of books adapted to students' interest and reading proficiency.

4

NUDGING TO STIMULATE READING IN PRIMARY AND SECONDARY EDUCATION

This chapter is based on:

Van der Sande, L., Wildeman, I., Bus, A. G., & Van Steensel, R. (2023). Nudging to stimulate reading in primary and secondary education. *SAGE Open, 13*(2), 1-17. http://doi.org/10.1077/21582440231166357

ABSTRACT

Many students infrequently read during leisure time. Due to fast, unconscious decisions, they may overlook the possibility of reading. We tested the impact of nudging on reading frequency, reading attitude, and reading skills. Two studies targeting Grades 4 to 6 (N = 105) and Grades 7 and 8 (N = 146) compared: 1) a nudging condition - participants twice a week receiving reminders to read, 2) an information condition - participants once receiving information about the importance of reading, and 3) a control condition - participants receiving neither information nor reminders. In primary education, nudges positively affected parents' knowledge of children's books and students' reading attitudes. In secondary education, nudges positively impacted students' book knowledge. All effects only occurred for those students and parents most prone to reading. For the majority of the students, nudges did not improve reading outcomes. Therefore, we speculate about more effective ways of nudging reading.

Keywords: leisure time reading, nudging, reminders, reading attitude

Infrequent out-of-school reading negatively impacts reading development: if children do not read in their leisure time, this limits opportunities for developing reading skills. Meta-analysing 99 studies (*N* = 7,669), Mol and Bus (2011) found moderate to strong correlations between print exposure and reading comprehension, decoding skills, and vocabulary, indicating that leisure time reading routines offer substantial advantages for language and literacy growth. However, for many students from the upper grades of primary education and beyond, reading is no or only a minor part of their out-of-school routines and not a recurrent, daily activity (Nippold et al., 2005; Strommen & Mates, 2004; Twenge et al., 2018; Wennekers et al., 2018). It is likely that those students do not develop their reading proficiency to the same extent as their peers who choose to read (Willingham, 2017).

Many infrequent readers do not dislike reading but still do not read (Clark & Foster, 2005; Willingham, 2017). We hypothesize that this is not necessarily the result of conscious, deliberate choices. It can also be attributed to so-called fast decisions, labeled by Kahneman (2011) as 'System 1' decisions. People make thousands of decisions each day (e.g., choosing whether to take the stairs or elevator or which route to go home). It would be impossible to process all those decisions consciously. System 1's primary task is to prevent cognitive overload due to System 2 operations, which are responsible for making conscious, deliberate decisions (Dolan et al., 2012; Kahneman, 2011; Thaler & Sunstein, 2008).

Appealing activities such as communicating with friends on social media or gaming (Nippold et al., 2005; Willingham, 2017) may easily attract students' attention at the expense of low-profile activities such as reading. Many students may thus often not consider reading an option during leisure time (Willingham, 2017), even if they are positive about reading (Clark & Foster, 2005; Merga & Roni, 2018). In other words, low engagement in leisure time reading is not necessarily the result of children's negative feelings towards reading: it may simply be caused by children automatically opting for other, more prominent activities. If this line of argumentation is correct, it would be helpful to 'nudge' students' reading during leisure time and thus influence fast decisions (Dolan et al., 2012; Lehner et al., 2016; Thaler & Sunstein, 2008; Vlaev et al., 2016). Thaler and Sunstein (2008, p. 6) define nudges as "any aspect of the choice architecture that alters people's behavior in a predictable way, without forbidding any options or significantly changing their economic incentives". In the current study, we test whether children will more often choose reading as a pastime activity if they are nudged to choose reading as a behavioral alternative (Willingham, 2017). We focused our study both on younger students (second half of primary education) and older students (early years of secondary education).

To promote choosing reading over other appealing alternatives, we used reminders to make reading more salient and draw students' attention to reading as a possible leisure time activity (Carlzolari & Nardottol, 2017; Dolan et al., 2012; Thaler & Sunstein, 2008). Reminders bring a particular decision or task to the recipients' attention and thus induce behavioral change (Damgaard & Gravert, 2018; Sunstein, 2014). In the older age group, the reminders were sent to students via their smartphones, while in case of students being too young to have a device and receive reminders, we sent these to parents. We hypothesize that as a result of receiving reminders, students' behavior might shift toward more frequent reading, which may promote students' interest in reading and reading proficiency (Allington & McGill-Franzen, 2021; Cunningham & Stanovich, 1998; Mol & Bus, 2011). However, not all students might benefit to the same extent. Reminders seem particularly useful if parents and students are prone to engage in reading activities, but do not act accordingly. If, by contrast, students do not like to read, nudging may not impact the choice for reading during their spare time (Thaler & Sunstein, 2008).

Several studies investigated reminders in educational settings. In a review study, Damgaard and Nielsen (2018) concluded that sending reminders to parents led to positive effects on parental involvement and student skills in most studies. However, the impact of sending reminders to students was mixed. Studies reported positive effects of reminders when they focused on specific tasks (e.g., completing college enrollment or contributing to an online forum), whereas fewer effects were found on outcomes that require ongoing effort (e.g., earned course credits and grades). One of the rare studies testing this approach to stimulate reading was conducted by Kraft and Monti-Nussbaum (2016), sending reminders in the form of text messages to parents to avoid summer reading loss in first through fourth graders. Parents received text-messages twice a week with different content. The messages, for example, contained information about accessible and affordable educational resources or suggestions for activities to support children's literacy development. Further, messages were sent to increase the saliency of summer reading and nudge parents to help their children engage in educational activities. As the study revealed positive effects on reading comprehension in third and fourth grade, the outcomes of this experiment are promising. However, the study provides limited insight in the mechanisms through which students' reading achievement improved. No effect was found on the frequency of parents' self-reported literacy activities and effects on students' reading frequency were not investigated.

The Current Study

The overall aim of the current study was to examine whether students' fast decisions to read could be promoted by reminders. We tested whether sending reminders via WhatsApp resulted in more reading and, consequently, contributed to a more positive reading attitude and better proficiency. Study 1 focuses on students in the upper grades of primary education and Study 2 on students in secondary education. In both studies, we compared three conditions. In the nudge condition, parents or students once received information about the importance of reading and subsequently twice a week received reminders of the need to read over a period of three months. We contrasted the nudge condition with two control conditions. Parents and students in the first control condition (no intervention) did not receive information or reminders. In a second control condition, parents or students once received information about the importance of reading. With the addition of this second control condition, we can exclude the possibility that information about the importance of reading alone would lead to increased reading. We hypothesized that it is essential to influence moment-to-moment choices, but we did not expect information alone to be effective.

STUDY 1: EFFECTS OF NUDGING IN PRIMARY EDUCATION

Study 1 focused on students from Grade 4 to 6. From fourth grade onward, many students' reading attitude and frequency begin to decline (Chall & Jacobs, 2003; McKenna et al., 1995; Parsons et al., 2018). We aimed to decrease this decline by sending parents reminders of the need to read via WhatsApp. We assumed parents have considerable influence on their children's leisure time activities in this phase and expected them to encourage their children to read more frequently.

We thus sought to answer the following three research questions:

1. Do reminders of reading stimulate parents to encourage their children to read?
2. Do such reminders influence children's print exposure and, through that, their reading attitude and reading comprehension?
3. Are reminders of reading more effective if children and parents are more prone to engage in reading?

METHOD

Design

Students and their parents were randomly assigned to the three conditions (nudge condition, information condition, and control condition). Parents completed an online questionnaire to measure home literacy activities and a title recognition list at pre- and

posttest. Students completed a title recognition list, a reading attitude questionnaire, and a reading comprehension test.

Participants

All parents from 12 classes in five schools from different regions in the Netherlands were invited to participate in the study. Parents of 105 students agreed to participate (nudge condition: *n* = 39, information condition: *n* = 32, control condition: *n* = 34). The 47 boys (45%) and 58 girls (55%) were on average 10.47 years old (*SD* = 0.85; range: 9.04-12.93) and were from Grade 4 (*n* = 36), Grade 5 (*n* = 47), and Grade 6 (*n* = 22).

In five families, two children participated. Thus, the total number of parents in the study was 100. At pretest, 62 parents completed the questionnaire (nudge condition: *n* = 24, information condition: *n* = 24, control condition: *n* = 14) and 51 parents completed the posttest questionnaire (nudge condition: *n* = 20, information condition: *n* = 19, control condition: *n* = 12). Parents were on average 41.56 years old (*SD* = 6.33; range: 29.82-58.29).

Intervention

Information Flyer

The information flyer, which was sent both to parents in the nudge and information condition, informed parents about the importance of reading and included some tips on how they can stimulate their children to read. The flyer for parents in the nudge condition also announced that parents would receive reminders (see Appendix 4A for the flyer in the information condition and Appendix 4B for the flyer in the nudge condition).

Nudges

Parents received WhatsApp messages including images to remind them of their child's reading; for example, a stack of books or a picture of a parent and a child reading together. The nudges, sent twice a week for 14 weeks, did not contain other information than the image. Since the aim was to promote leisure time reading, reminders were sent outside school hours. Parents received the nudges on different days and times to ensure that all participants received reminders when their child had the opportunity to read (see Appendix 4C for the scheme).

Measures Parents

Home Literacy Activities

A questionnaire based on Klauda and Wigfield (2012) and Mullis (2007) was used to assess home literacy activities. It contained six questions, for example, 'How

frequently do you encourage your child to read in his/her spare time?'. All questions were answered on a 4-point Likert-scale, ranging from 1 (*never or almost never*) to 4 (*every day or almost every day*). Total scores were calculated by averaging scores on the six items. Cronbach's α at pretest equaled .75 and at posttest .69.

Knowledge of Children's Books

To assess parents' knowledge of children's books, they completed a title recognition list (Stanovich & West, 1989). Parents checked familiar titles on a list containing 34 titles of existing books appropriate for students in the upper grades of primary school (selected from the bestselling list of a popular webstore). To discourage guessing, the list also contained 16 fake titles. Scores were calculated by subtracting the percentage of (incorrectly) checked fake titles from the percentage of (correctly) checked genuine titles. Higher scores indicate more knowledge of children's books, suggesting that parents were more involved in reading activities with their children. To prevent a testing effect, we developed two versions (A and B), which were randomly assigned to the participants. Half of the number of parents completed version A at pretest and version B at posttest and half vice versa. Both versions had satisfactory reliabilities (Cronbach's α version A: pretest = .88, posttest = .80, version B: pretest = .84, posttest = .87). As version B included fewer well-known books than version A (t[58] = 1.99, p = .05), pretest and posttest scores on version B were increased with the difference between the average scores on version A and B at pretest (7.55), so that the mean score of both versions at pretest was the same.

Measures Students

Print Exposure

Students completed the same title recognition list as parents as an indicator of print exposure. Two versions were created to prevent a testing effect. Cronbach's α's were satisfactory (version A: pretest = .90, posttest = .85, version B: pretest = .79, posttest = .86). Similar to the parent instrument, version B included fewer well-known books than version A (t[96] = 2.97, p < .01). We corrected for this difference by adding 10.06 (the difference between the two averages at pretest) to pretest and posttest scores on version B.

Reading Attitude

The Picture Evaluation Task was used as indicator of students' reading attitude (Nielen et al., 2018). Students rated 24 pictures and 16 Dutch words on a 6-point Likert-scale, ranging from 1 (*not attractive at all*) to 6 (*very attractive*). Half of the pictures and words were related to reading and the other half were not. Reading pictures and neutral pictures were matched on color and size of the objects in the picture and the presence

of persons or animals. Words were matched on word length (for example 'book' and 'door'). Total scores were calculated by subtracting students' average rating of the neutral items (Cronbach's α pretest = .84, posttest = .88) from their average rating of the reading items (Cronbach's α pretest and posttest = .95). Higher scores indicate a more positive reading attitude. In a validation study, including students from Grades 4 to 8, this measure was a strong predictor of scores on a reading attitude questionnaire, familiarity with books, and an attentional bias toward reading-related pictures (Nielen et al., 2016).

Reading Comprehension

We administered a standardized reading comprehension test (De Vos, 2011) containing short texts with multiple-choice questions. An age-appropriate test was used in every grade. The questions required inferencing, integration of information, and demonstrating understanding of text structure. We divided the tests into two parts (version A and B) comparable in the amount of text and the total number of questions (ranging from 17 to 21). We scored in percentage correctly answered questions (Cronbach's α pretest = .77 and posttest = .76). The average scores on version A and B were similar for all grades; Grade 4: $t(34) = 1.21$, $p = .24$; Grade 5: $t(44) = 0.47$, $p = .64$; and Grade 6: $t(17) = 0.63$, $p = .54$.

Procedure

The study was approved by the faculty's Ethical Review Board. To elect for participation, parents were asked for their informed consent, email address, and mobile phone number, which we used when sending reminders in the nudge condition. At pre- and posttest, parents received an email with a link to the home literacy questionnaire and title recognition list. If needed, we sent parents reminders to fill in the questionnaire. Students individually completed the title recognition list, reading attitude questionnaire, and reading comprehension test during whole-classroom sessions, taking approximately 60 minutes. All instruments were introduced by the first author or a trained research assistant. Teachers were present to maintain order.

Data-analysis

We tested whether multi-level analyses were necessary, by comparing the model fit of one-level and two-level models (students in classes). Adding a second level did not lead to a significant improvement in model fit for any of the variables (home literacy activities: $p = .28$; parents' knowledge of children's books: $p = .44$; children's print exposure: $p = .76$; reading attitude: $p = 1.00$; reading comprehension $p = 1.00$). Therefore, we used (one-level) multiple-regression analyses.

First, we performed multiple-regression analyses on parent outcomes (home literacy activities and knowledge of children's books). Pretest scores and experimental condition were entered as predictors. We tested condition effects through two orthogonal contrasts. The first contrast, 'nudge vs. rest', distinguished the nudge condition from the control conditions. The second contrast, 'information vs control', distinguished the control condition in which participants received information about the relevance of reading from the control condition in which they did not receive information. We did not expect a difference between the two control conditions (second contrast). Finally, we entered interactions between pretest scores and the contrasts to test whether the nudges were more effective if parents were more prone to engage in reading activities with their children.

We performed similar analyses for the effect measures administered to children (print exposure, reading attitude, reading comprehension). Apart from pretest scores and experimental condition, we added grade and gender as predictors. Finally, we entered the interactions of pretest scores and grades with the contrasts.

We used the EM procedure in SPSS to impute estimated values of missing items on the reading attitude questionnaire. We considered missing items on the reading comprehension test incorrect. Students and parents with missing scores on an entire questionnaire or test were excluded from the analysis. Analyses were conducted with participants with complete data on the concerning variables (home literacy activities: 45; parents' knowledge of children's books: 43; children's print exposure: 94; reading attitude: 94; and reading comprehension: 98).

Implementation

Five out of 39 parents in the nudge condition withdrew their participation in the intervention before the end of the intervention period. One parent indicated she would only like to receive messages if they also contained tips and two parents indicated they did not need the reminders because they often stimulated their children to read. We checked if parents received the nudges by registering double ticks in WhatsApp. Eight parents did not receive all nudges, probably because they blocked the messages. On average, these parents received 10.54 nudges (*SD* = 9.83). The remaining 26 parents (67%) received all 28 nudges. Inspecting scores of parents who did not receive all nudges on title recognition and home literacy activities, we found that, particularly on title recognition, their scores were relatively low (11.96 [*SD* = 12.45] versus 19.07 [*SD* = 14.43] for the total sample), suggesting that these parents were less focused on their children's reading.

RESULTS

Effects on Parents

Home Literacy Activities

At pretest, parents in the three conditions did not significantly differ in home literacy activities, $F(2,59) = 2.77$, p, = .07 (see Table 1). We found a positive effect of pretest scores on posttest scores of home literacy activities (see Table 2). There was no significant effect of nudging: parents receiving nudges reported to stimulate their child's reading to the same extent as parents not receiving nudges. There were also no significant effects of the information condition or of the interactions between pretest scores and contrasts. Closer inspection of the item scores showed relatively high scores on both pretest and posttest (see Table 3): parents reported to engage in home literacy activities with their children quite frequently beforehand and this hardly changed during the experiment.

Table 1. Means, Standard Deviations, and Correlations on Home Literacy Activities, Parents' Knowledge of Children's Books, Students' Print Exposure, Reading Attitude, and Reading Comprehension in Grades 4 to 6 ($N_{parents}$ = 50-62; $N_{students}$ = 98-102)

	M (*SD*) Total	*M* (*SD*) Nudges	*M* (*SD*) Information	*M* (*SD*) Control	1	2	3	4	5	6	7	8	9	10
Pretest														
Parents														
1. Home literacy activities	2.25 (0.63)	2.48 (0.54)	2.10 (0.62)	2.11 (0.70)	-									
2. Knowledge of books	19.07 (14.43)	17.90 (14.95)	22.76 (14.47)	14.95 (12.92)	-.04	-								
Students														
3. Print exposure	22.78 (16.39)	20.62 (14.54)	20.77 (17.60)	27.31 (16.77)	-.15	.25	-							
4. Reading attitude	0.56 (1.03)	0.43 (1.19)	0.56 (0.98)	0.70 (0.91)	-.09	.17	.39***	-						
5. Reading comprehension	67.34 (20.24)	66.85 (18.66)	65.95 (23.31)	69.22 (19.18)	-.01	.23	.31**	.19	-					
Posttest														
Parents														
6. Home literacy activities	2.31 (0.58)	2.39 (0.61)	2.30 (0.46)	2.18 (0.70)	.74***	-.22	-.33*	-.27	-.07	-				
7. Knowledge of books	23.36 (13.65)	24.82 (17.70)	23.20 (11.43)	21.29 (9.75)	-.15	.51***	.30*	.42**	.00	-.28*	-			
Students														
8. Print exposure	24.45 (14.32)	21.51 (13.81)	23.43 (16.31)	28.70 (12.14)	.07	.24	.41***	.30**	.16	-.04	.32*	-		
9. Reading attitude	0.56 (0.98)	0.49 (1.18)	0.35 (0.89)	0.82 (0.78)	-.14	.19	.35***	.75***	.17	-.32*	.41**	.14	-	
10. Reading comprehension	69.91 (19.66)	69.14 (19.85)	70.96 (23.01)	69.78 (16.41)	-.07	.33*	.36***	.28**	.45***	-.13	.23	.27**	.32**	-

* $p < .05$. ** $p < .01$. *** $p < .001$.

Table 2. Results of Regressing Home Literacy Activities and Parent's Knowledge of Children's Books on Pretest Scores and Experimental Condition

Parameter	Home literacy activities	Knowledge of children's books
Intercept	2.27 (0.07)	19.52 (1.59)
Pretest scores	0.69 (0.10)***	0.39 (0.12)**
Contrast nudge vs rest	-0.01 (0.05)	-0.38 (1.09)
Contrast information vs control	0.10 (0.08)	0.91 (2.02)
Pretest × contrast nudge vs rest	0.07 (0.07)	0.37 (0.08)***
Pretest × contrast information vs control	-0.15 (0.11)	0.35 (0.16)*

Note. Standard errors are presented in parentheses.
* $p < .05$. ** $p < .01$. *** $p < .001$

Table 3. Means and Standard Deviations on Home Literacy Activities ($N_{parents}$ = 51-62)

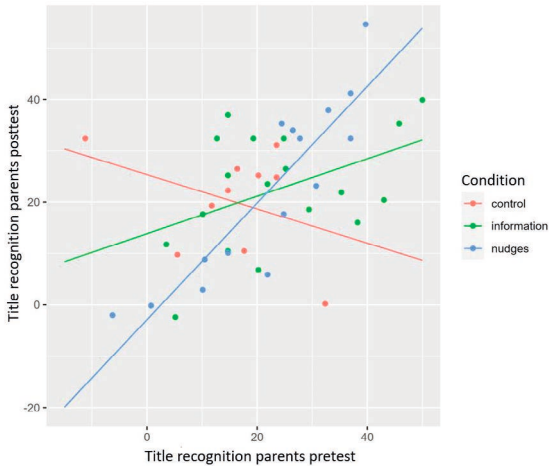
	M(*SD*) Pretest	*M*(*SD*) Posttest
How frequently do you suggest books for your child to read?	1.92 (0.84)	1.94 (0.71)
How frequently do you encourage your child to read in his/her free time?	2.76 (0.99)	2.84 (0.97)
How frequently does your child see you read in your free time?	2.87 (0.97)	2.88 (0.97)
How frequently do you talk with your child about a book he/she has read in his/her free time?	2.32 (0.86)	2.37 (0.87)
How frequently do you read out loud together with your child?	2.00 (1.10)	2.16 (1.12)
How frequently do you read a book, while your child is reading too?	1.63 (0.89)	1.65 (0.82)

Note. 1 = (almost) never, 2 = one or more times a month, 3 = one or more times a week, 4 = (almost) every day

Parents' Knowledge of Children's Books

At pretest, parents in the three conditions did not significantly differ in their knowledge of children's books, $F(2,57) = 1.42$, p, = .25. Three variables had a significant effect on posttest knowledge of children's books (see Table 2). First of all, there was a positive effect of pretest scores. Second, the positive interaction between pretest scores and the contrast 'nudge vs rest' indicates that parents familiar with children's books benefited from nudging. Third, the positive interaction between pretest scores and the contrast 'information vs control' indicates a slight positive effect for the provision of information for parents familiar with children's books (see Figure 1).

Figure 1. Interaction Effect of Pretest Scores and Experimental Condition on Parents' Knowledge of Children's Books



Effects on Students

Print Exposure

At pretest, students in the three conditions did not significantly differ in print exposure, $F(2,95) = 1.76$, $p = .18$). There were significant main effects of pretest scores and grade on print exposure at posttest (see Table 4). The negative effect of grade indicates that students in the higher grades were reading less than students in the lower grades. The nudges did not improve students' print exposure. The effect of information and the interactions between the covariates and contrasts were not significant either.

Table 4. Results of Regressing Print Exposure, Reading Attitude, and Reading Comprehension on Pretest Scores, Background Variables, and Experimental Condition in Grades 4 to 6

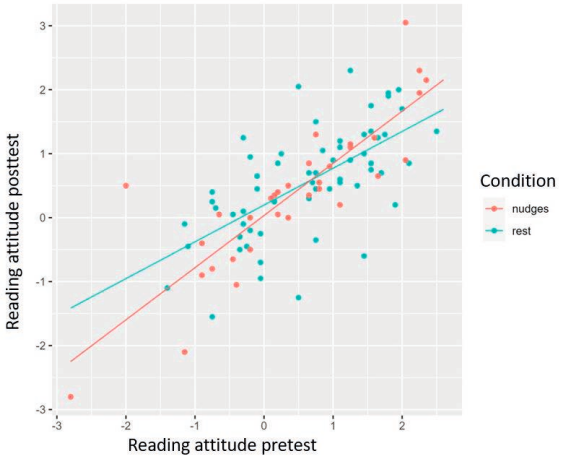
Parameter	Print exposure	Reading attitude	Reading comprehension
Intercept	27.18 (2.71)	0.52 (0.14)	66.43 (3.41)
Pretest scores	0.32 (0.08)***	0.61 (0.08)***	0.34 (0.09)***
Gender (0 = boy)	2.73 (2.81)	0.13 (0.16)	12.60 (3.67)***
Grade (0 = Grade 4)	-4.16 (1.91)*	-0.10 (0.10)	-3.67 (2.45)
Contrast nudge vs rest	-2.36 (1.39)	-0.02 (0.07)	-1.24 (1.84)
Contrast information vs control	-2.44 (2.60)	-0.25 (0.13)	2.05 (3.33)
Pretest × nudge vs rest	-0.001 (0.06)	0.09 (0.04)*	0.09 (0.06)
Pretest × information vs control	0.01 (0.10)	-0.02 (0.09)	0.13 (0.10)
Grade × nudge vs rest	0.96 (1.31)	0.01 (0.07)	0.69 (1.76)
Grade × information vs control	1.33 (2.39)	0.07 (0.12)	-1.38 (3.02)

Note. Standard errors are presented in parentheses.
* $p < .05$. ** $p < .01$. *** $p < .001$

Reading Attitude

At pretest, children in the three conditions did not significantly differ in reading attitude, $F(2,95) = 0.57$, p, = .57. The reading attitude pretest score was a significant predictor of reading attitude posttest score (see Table 4). The positive interaction between pretest scores and the contrast 'nudge vs rest' suggests that nudges were stimulating if students had a relatively positive reading attitude during pretest. As Figure 2 indicates, a positive effect was only present in a small group with a very high reading attitude. The majority of the children did not show differences favoring nudges.

Figure 2. Interaction Effect of Pretest Scores and Experimental Condition on Children's Reading Attitude



Reading Comprehension

At pretest, students in the three conditions did not significantly differ in reading comprehension, $F(2,98) = 0.23$, $p = .80$. In addition to pretest scores, only gender affected the posttest score on reading comprehension (see Table 4): girls outperformed boys. There was no effect of condition, and none of the interactions between the covariates and contrasts were significant.

DISCUSSION

Reminders of reading affected parents' knowledge of children's books, but only if parents were already quite familiar with children's books at pretest. If parents only received information about the importance of reading once, we found a similar, albeit smaller effect. So, both the nudges and the information flyers incentivized parents to search for attractive books for their children. There is no evidence of impact on parents' home literacy activities, such as reminding their children to read. This lack of

effects may be so because parents' pretest scores on this questionnaire were already relatively high, or answers were only a pale shadow of actual events, as the absence of significant, positive correlations between home literacy activities and knowledge of children's books suggests.

Sending reminders to parents positively affected children's reading attitude, but only for a small number of students whose reading attitude was high at the pretest. This effect was likely made possible by parents' active attempts to find appropriate books for their children, which aroused their interest. However, for the majority of the children, the reminders their parents received did not positively affect their reading attitude. Further, we did not find any effects on children's print exposure or reading comprehension.

STUDY 2: EFFECTS OF NUDGING IN SECONDARY EDUCATION

Study 2 targeted students in Grade 7 and 8 of prevocational secondary education, the least demanding level of Dutch secondary education. Many of these students are reluctant to read during leisure time (DUO Onderwijsonderzoek, 2017), and we assumed these students could particularly benefit from nudging. As students in this age range typically control their leisure time activities, we sent nudges directly to students. As we expected that some interest in reading may be necessary for nudges to be effective (Thaler & Sunstein, 2008), we tested whether the intervention was particularly effective for students who were more prone to read.

We aimed to answer the following two research questions:

1. Do reminders of reading influence children's print exposure and, through that, their reading attitude and reading comprehension?
2. Are reminders of reading more effective if students are more prone to engage in reading?

METHOD

Design

Students were randomly assigned to one of three conditions: a nudge condition, an information condition, and a control condition. Students completed a title recognition list, a reading attitude questionnaire, and a reading comprehension test at pre- and posttest.

Participants

We recruited the participants from 21 classes in eight schools in different regions in the Netherlands. Parents were informed about the study and received a form that enabled them to refuse consent for participation. Students were encouraged to sign up for the study by raffling a cinema ticket among every school's participants. 146 students participated (nudge condition: n = 50, information condition: n = 50, control condition: n = 46). The 66 boys (45%) and 80 girls (55%) were on average 13.34 years old (SD = 0.82, range: 11.86-16.11) and were in Grade 7 (n = 79) or 8 (n = 67).

Intervention

Information Message

Students in the information and nudge condition received one WhatsApp message, explaining that reading is important for learning new vocabulary, expanding general knowledge, and understanding other people's emotions, and, therefore, reading daily is vital.

Nudges

Students received pictures related to reading as reminders of reading, for example a stack of books or someone who is reading. The messages did not include any additional information about reading or tips. The nudges were sent via WhatsApp twice a week during leisure time for a period of 14 weeks (see Appendix 4D). We varied days and times to guarantee that at least part of the messages came in at suitable moments.

Measures

Print Exposure

A title recognition list was used as an indicator of print exposure (Stanovich & West, 1989; see Study 1). We included books appropriate for students in the upper grades of primary education (9-12 years) and books for adolescents, accounting for variation in students' reading level. Two versions were developed to prevent a testing effect, both containing 34 existing titles and 16 fake titles (Cronbach's α version A: pretest = .75, posttest = .88; version B: pretest = .85, posttest = .84). At pretest, there was no significant difference in average scores between versions, $t(144) = -1.31$, $p = .19$, indicating that both included an equal number of well-known books.

Reading Attitude

We assessed reading attitude with a questionnaire (Aarnoutse, 1990) containing 27 yes/no questions, for example: "Do you like reading a lot?" and "Do you find reading in class boring?". After recoding negatively formulated items, a sum score was calculated (Cronbach's α pretest and posttest = .93). Previous studies indicated that scores on the

Reading Attitude Scale significantly correlated with scores on a title recognition list and a reading comprehension test (Nielen & Bus, 2015; Nielen et al., 2016). Further, it was found that reluctant readers, who were not familiar with age-appropriate books, scored significantly lower on this questionnaire than more enthusiastic readers (Nielen et al., 2016).

Reading Comprehension

We used the SALT-reading test to assess reading comprehension (Van Steensel et al., 2013), which includes texts varying in genre (narrative, expository, argumentative, instructive) with factual and inferential questions. The test was divided in two parts to prevent testing effects, each containing 37 mostly multiple-choice questions and a few open-ended questions (seven in version A and four in version B). Open-ended questions were coded by two independent coders. Two items had low inter-rater reliability and were, therefore, not included in the total score. Total scores were the number of questions answered correctly (Cronbach's α version A: pretest = .81, posttest = .80, version B: pretest and posttest = .80). At pretest, the average score on version A was lower than the average score on version B (t[116] = -4.75, p < .001), indicating that version A was more difficult. To correct for this difference, pretest and posttest of version A were increased with 5.19 (the difference between the A and B version at pretest), so that both versions had the same mean at pretest.

Procedure

At pre- and posttest, students completed the title recognition list, reading attitude questionnaire, and reading comprehension test during entire classroom sessions. The sessions were introduced by the second author or a trained research assistant, while teachers were present to maintain order. The administration of the questionnaire and the administration of the reading comprehension test both took approximately 50 minutes. The procedure was approved by the faculty's Ethical Review Board.

Data-analysis

We tested whether multi-level analyses were necessary. For print exposure (Δ-2 Log Likelihood = 7.879, df = 1, p = .01) and reading comprehension (Δ-2 Log Likelihood = 22.814, df = 1, p < .001) a two-level model (students in classes) fitted the data significantly better than a one-level model. We therefore performed multi-level analyses with two levels for all dependent variables.

Pretest scores, gender and condition were entered as predictors. Since there was less variation in grades than in our study in primary education, and to prevent loss of statistical power, we did not include grade in the analyses. The intervention effect

was tested with two contrasts: 'nudge vs rest' and 'information vs control'. Lastly, the interactions between the pretest score and contrasts were added.

The EM procedure in SPSS was used to impute estimated values of missing items on the reading attitude questionnaire and title recognition list. We considered missing items on the reading comprehension test incorrect. If more than three consecutive items were missing on a reading comprehension task, the total test was coded as missing (Van Steensel et al., 2013). This was the case for 21 students at pretest and 19 students at posttest. Eight of them had incomplete reading comprehension tests at both measurements. Students with missing scores on an entire questionnaire or test were excluded, so analyses were conducted with 134 (print exposure), 132 (reading attitude), and 98 participants (reading comprehension).

Implementation

Two students in the nudge condition withdrew their participation in the intervention without giving a reason. By registering double ticks in WhatsApp, we checked whether students received our messages (i.e., the information message and the nudges). One student in the information condition did not receive the information message probably due to an incorrect phone number. Sixteen students in the nudge condition did not receive all nudges. On average, these students received 9.44 nudges (SD = 8.95) out of 28. They probably blocked the messages on WhatsApp. The remaining 32 students (64%) received all nudges. Inspecting scores of students who did not receive all nudges, we found that, in general, their scores were comparable to the total sample.

RESULTS

Effects of the Intervention

Print Exposure

At pretest, students in the nudge condition, information condition, and control condition did not significantly differ in print exposure, $F(2,143) = 0.53$, $p = .59$ (see Table 5). Students' pretest print exposure scores predicted their posttest scores (see Table 6). Additionally, there was a significant effect of gender: girls outperformed boys. Although there was no significant main effect of the nudges, there was a significant interaction effect. The positive interaction of pretest scores and 'nudge vs. rest' suggests that students with higher print exposure at pretest benefitted from the nudges, while students with lower pretest scores did not. As can be seen in Figure 3, this effect was marginal and restricted to students with very high pretest scores. For most students, the effects of nudges were negative.

Table 5. Means, Standard Deviations, and Correlations on Print Exposure, Reading Attitude, and Reading Comprehension in Grades 7 and 8 (N = 113-146)

	M (*SD*) Total	*M* (*SD*) Nudges	*M* (*SD*) Information	*M* (*SD*) Control	1	2	3	4	5	6
Pretest										
1. Print exposure	12.77 (11.45)	14.11 (12.17)	11.88 (11.90)	12.29 (10.19)	-					
2. Reading attitude	10.80 (7.58)	9.80 (7.48)	10.85 (8.05)	11.82 (7.19)	.11	-				
3. Reading comprehension	24.61 (5.87)	23.82 (5.28)	24.43 (5.89)	25.54 (6.39)	.31***	.16	-			
Posttest										
4. Print exposure	14.60 (12.10)	13.75 (14.95)	13.67 (10.12)	16.50 (10.76)	.40***	.18*	.30**	-	-	
5. Reading attitude	10.05 (7.30)	9.06 (7.36)	9.55 (7.30)	11.65 (7.16)	.00	.85***	.12	.21*		
6. Reading comprehension	23.92 (5.88)	23.27 (5.99)	23.38 (5.80)	25.34 (5.79)	.22*	-.00	.50***	.24*	-.02	-

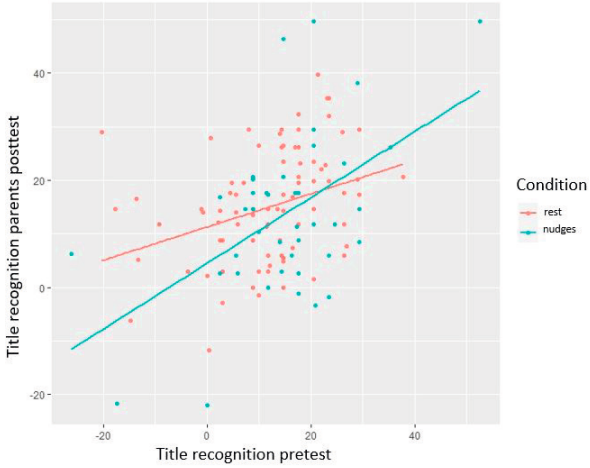
* $p < .05$. ** $p < .01$. *** $p < .001$.

Table 6. Results of Regressing Print Exposure, Reading Attitude, and Reading Comprehension on Pretest Scores, Background Variables, and Experimental Condition in Grades 7 and 8

Parameter	Print exposure	Reading attitude	Reading comprehension
Fixed effects			
Intercept	11.95 (1.36)	9.95 (0.48)	23.52 (0.91)
Pretest scores	0.42 (0.08)***	0.81 (0.04)***	0.39 (0.08)***
Gender (0 = boy)	4.45 (1.89)*	0.01 (0.67)	0.91 (0.95)
Contrast nudge vs rest	-0.85 (0.66)	-0.02 (0.24)	-0.48 (0.31)
Contrast information vs control	-0.96 (1.14)	-0.59 (0.41)	-0.15 (0.54)
Pretest × nudge vs rest	0.12 (0.06)*	-0.03 (0.03)	0.01 (0.06)
Pretest × information vs control	0.01 (0.11)	-0.02 (0.05)	-0.10 (0.09)
Random effects			
Level 2 (class)			
Random interceptvariance	0.00 (0.00)	0.00 (0.00)	5.61 (3.73)
Level 1 (student)			
Random interceptvariance	111.94 (13.78)	14.08 (1.75)	17.68 (2.83)
Modelfit			
-2 Log Likelihood	997.365	712.708	575.607

Note. Standard errors are presented in parentheses.
* $p < .05$. ** $p < .01$. *** $p < .001$.

Figure 3. Interaction Effect of Pretest Scores and the Nudge Condition on Students' Print Exposure



Reading Attitude

At pretest, students in the three conditions did not significantly differ in reading attitude $F(2, 141) = 0.84$, $p = .44$. Apart from a significant effect of pretest scores on reading attitude at posttest, none of the predictors had a significant effect (see Table 6). The interactions between the covariates and contrasts were not significant either.

Reading Comprehension

At pretest, students in the three conditions did not significantly differ in reading comprehension $F(2,115) = 0.85$, $p = .43$. Reading comprehension posttest scores were significantly predicted by reading comprehension scores at pretest (see Table 6). There was no significant main effect of the nudges or information on reading comprehension and none of the interactions between the covariates and contrasts were significant.

DISCUSSION

In prevocational secondary education, the nudges had limited effects on students' reading. The nudges only positively affected print exposure for students who showed substantial interest in reading at pretest, as indicated by relatively high title recognition scores. For most students, reminders did not increase print exposure, indicating that the nudges did not affect their reading activities. Furthermore, we found no effects on reading attitude and reading comprehension.

GENERAL DISCUSSION

Many students are willing to read but may not do so because of numerous competing activities (Willingham, 2017). In this study, we tested whether reminders to parents (Study 1) or students (Study 2) can increase reading. We found limited evidence showing that this approach is helpful. In Study 1, the nudges had a positive effect on parents' knowledge of children's books. However, we found this effect only if parents were more familiar with children's books at pretest. In addition, the nudges positively affected students' reading attitude but only for those students with an initial positive attitude. In Study 2, the nudges positively affected book knowledge but only if students had high scores at pretest. In addition, for students less interested in reading, nudging even seems to work counterproductively. The reminders appeared to annoy them, causing adverse effects on students' reading (Damgaard & Gravert, 2018).

We additionally hypothesized that influencing students' reading behavior would incite a positive cycle: we assumed that more frequent reading as a result of nudging would result in more positive attitudes toward reading and better reading comprehension.

We found no support for this hypothesis. Study 1 suggests that part of the parents became more active in supporting their children's reading by searching for titles that would interest their children, making them enthusiastic about reading. However, we did not observe a rise in children's book knowledge or reading skills in line with their increased interest. Likewise, in Study 2, we observed students became more actively engaged with books (i.e., they knew more book titles), but this did not result in more positive attitudes towards reading or higher reading proficiency.

Theoretical Implications

We argued that the choice to read is often the outcome of so-called fast decisions (Dolan et al., 2012; Kahneman, 2011; Thaler & Sunstein, 2008). As a result, other appealing activities may dominate, and students neglect reading as an option during leisure time if they are not regularly reminded of the possibility to read (Willingham, 2017). By sending reminders, we indeed made reading more salient for parents and students most prone to read. This effect is in line with nudging theory, which assumes that nudges address existing intentions and thereby facilitate behavioral choices (Thaler & Sunstein, 2008). In this vein, the reminders made it easier for parents and students who already had positive intentions to more frequently engage with books.

This argument may also explain why the nudges did not affect participants' behavior when they were less prone to read. The use of reminders is to help people not to miss activities they plan to undertake (Damgaard & Nielsen, 2018). However, it might be that many parents and students may not consider reading as an essential part of their activity repertoire, in which case the messages do not function as reminders (e.g., Evans et al., 2004). It seems necessary for these parents and students first to convince them of the importance of leisure time reading and set goals to achieve more reading. Another possibility is that some students have developed a resistance to reading due to negative reading experiences (Nielen et al., 2016). Messages about reading will not help them start reading but remind them of an activity they want to avoid. For these students, reminders may elicit negative rather than positive responses.

Limitations and Future Research

In line with the conclusions above, it seems crucial to guarantee fertile breeding ground for nudges. When parents and students agree that reading is essential and needs to be a regularly returning spare time activity, they appear to make sense. However, there are also other potential limitations. For instance, the arrival of the reminders might not have been well-timed, coming in at times when participants did not have the opportunity to read. A more personalized timing might have more impact on the decision to read (Essl et al., 2021).

Furthermore, we have no information about participants' responses to receiving the reminders and do not know if the reminders caused an immediate reaction in the form of a reading-related activity. Qualitative information on how participants responded to our nudges might provide more insight into the nudges' impact.

The assumption is that nudges incite a pattern of change that may affect reading habits in the long term: students who have been repeatedly nudged automatically start reading at spare moments without considering alternatives (Owusu-Acheaw & Larson, 2014; Schmidt & Retelsdorf, 2016). However, as it likely takes some time for new routines to grind in, the current study was not long enough to demonstrate such effects. Future studies should pay attention to the impact in the long term and investigate whether nudges could lead to new reading habits.

Conclusion

Infrequent out-of-school reading has negative consequences for students' reading interests and ability. The current study tested whether regularly sending reminders of reading might be helpful and prevent the dominance of other leisure time activities than reading. Sending reminders indeed made some students more positive about reading and more inclined to opt for reading as a pastime. However, for most students, sending reminders to parents or the students themselves was insufficient to move them toward more leisure time reading. Further research is warranted to test whether more students would benefit from a revised intervention. We expect that in particular when students set personal reading goals, they benefit from the reminders. However, we also expect some students not to profit even if we personalize the messages because they do not perceive reading as an essential activity. Therefore, reminders can be crucial in stimulating reading, but only if the participants meet particular conditions. For students less prone to reading, other interventions are needed.

5

GENERAL DISCUSSION

Frequent reading is important for children's reading development: more print exposure is related to better reading comprehension, more fluent reading, and a larger vocabulary (Allington & McGill-Franzen, 2021; Mol, 2022; Mol & Bus, 2011). Nevertheless, many students do not read often. They rarely read during leisure time (Inspectorate of Education, 2022; Nippold et al., 2005; Strommen & Mates, 2004; Twenge et al., 2018; Wennekers et al., 2018) and do not effectively use the time scheduled for reading at school (Reutzel et al., 2010). Consequently, they have limited opportunities to practice their reading skills. Particularly students in the upper grades of primary education and in secondary education read infrequently and the number of non-readers among these students seems to be increasing (Huysmans et al., 2013; Nippold et al., 2005; Wennekers et al., 2018). Reading promotors (teachers, librarians) and educational policymakers are looking for ways to counter this negative trend (Council for Culture & Dutch Education Council, 2019; Dutch Reading Foundation, 2020a, 2020b; Reading Coalition, 2020). To make informed decisions on how to promote students' reading effectively, it is important to gain insights into reasons students have for infrequent reading: such insights can then provide the foundation for effective interventions. The aim of this dissertation, therefore, was to investigate possible reasons for infrequent reading. Three hypotheses were tested:

1. Reading frequency is determined by reading motivation: if students have positive beliefs about reading—that is, if they think reading is an enjoyable, worthwhile activity they can perform successfully—they will read more frequently; if they lack such beliefs, they will read infrequently.
2. Reading frequency is determined by the ability to select appropriate reading materials: if students can read books that match their reading level and interests, reading will likely be a positive experience and students will read more often; if students are not able to find appropriate books, reading will be frustrating and reading frequency will suffer.
3. Reading frequency is determined by behavioral routines: (leisure time) reading implies investing time in reading at the expense of other, competing activities. If reading is a salient behavioral alternative and students' attention is not automatically drawn to other activities, they will read more frequently; if this is not the case, they will read infrequently.

Below, I will first reiterate how we tested these hypotheses, and, summarizing the main findings from the three studies in this dissertation, I will discuss the validity of the hypotheses. Then, I will discuss the implications of our findings for the practice of reading promotion. Finally, I will describe the limitations of the studies and provide perspectives for future research.

Summary and Discussion of Main Findings

In Chapter 2, we examined whether there is support for the hypothesis that students' infrequent reading is explained by a lack of reading motivation. Meta-analyzing 39 reading motivation intervention studies, we examined if triggering positive beliefs about reading would result in more reading. Because few studies explicitly tested the effect of reading motivation interventions on reading frequency, we assumed that positive intervention effects on reading proficiency would support our hypothesis, because we supposed the occurrence of a mediation effect: more positive beliefs about reading lead to more frequent reading, which results in more proficient reading (Kavanagh, 2019; Schaffner et al., 2013; Schiefele et al., 2012; Stutz et al., 2016). The outcomes of the meta-analysis supported Hypothesis 1: interventions triggering positive beliefs about reading generally promoted students' reading comprehension. It can therefore be concluded that low reading motivation is one viable explanation for infrequent reading.

In the meta-analysis, we additionally tested which interventions are most successful in steering positive beliefs about reading. Moderator analyses indicated that particularly exposing students to reading materials that match their individual interests or to activities that incite situational interest in texts (e.g., real-world activities connected to the theme of a book, such as field trips) promotes both reading motivation and comprehension. This outcome implies that infrequent reading could additionally be explained by the fact that students are often confronted with texts that are not of interest to them, a conclusion that resounds in the results of the experiments described in Chapter 3. In this chapter, we examined difficulties in selecting appropriate reading materials as an explanation for infrequent reading. Our hypothesis was that students read infrequently if they are not able to find books that match their reading level and interests. This is expected to increase the likelihood of negative reading experiences, which then hampers further reading (Kragler, 2000; Mackey, 2014; Merga & Roni, 2017; Merga, 2018; Reutzel et al., 2010). We assumed that if taking away this barrier, by helping students to select appropriate books, leads to a more positive reading attitude, more familiarity with books, and better reading skills, it is valid to conclude that difficulties in selecting appropriate reading materials are a factor in infrequent reading.

In two separate experiments, conducted in the upper grades of primary education and in prevocational secondary education, students received personalized expert guidance by a librarian to help them select appropriate books for Independent Silent Reading at school. Overall, expert guidance positively affected students' reading attitude, although no effects were found for struggling readers in prevocational secondary education. For the most proficient readers in primary education, a positive effect on

reading comprehension was found as well. These findings suggest that better access to books that match students' reading levels and interests resulted in more favorable reading experiences, which positively influenced students' reading attitude. This positive attitude likely resulted in more practice, leading to more proficient reading for some students. In other words, the results of the two experiments support Hypothesis 2, that difficulties in selecting appropriate reading materials explain infrequent reading.

In Chapter 4, we examined behavioral routines as an explanation for infrequent reading. We hypothesized that students' preference for other activities than reading during leisure time is not so much the result of deliberate choices but rather the consequence of automatic, 'fast' decisions (Kahneman, 2011; Willingham, 2017). The basic idea is that some behavioral alternatives are more salient than others (e.g., a smartphone is more appealing than a book) and people routinely opt for those more salient activities. We assumed that influencing fast decisions by making reading a more salient behavioral alternative promotes choosing reading over other activities; we used so-called 'nudges' in the form of reminders to test this hypothesis (Dolan et al., 2012; Lehner et al., 2016; Thaler & Sunstein, 2008; Vlaev et al., 2016). We assumed that if nudging leads to a more positive reading attitude, more familiarity with books, and better reading skills, it would be valid to conclude that behavioral routines are a factor in infrequent (leisure time) reading.

We tested the effects of nudging in two experiments in primary education and prevocational secondary education. WhatsApp messages were sent to students or their parents to remind them of the possibility to read, thus making reading a more salient leisure time activity (Carlzolari & Nardottol, 2017; Dolan et al., 2012; Sunstein, 2014). The outcomes of the experiments provide partial support for Hypothesis 3, that behavioral routines explain infrequent reading. In primary education, positive effects of nudges were found on parents' knowledge of children's books and students' reading attitudes, but only for parents who were already relatively familiar with children's books and for students whose reading attitude was already quite high. In prevocational secondary education, the nudges had a positive effect on students' book knowledge, but only for students who were already quite familiar with books. In both studies, the nudges apparently altered the routines of some parents and students: the outcomes indicated they chose reading over other activities during leisure time more often.

The differential effects we found in all studies suggest that, for struggling and reluctant readers, infrequent reading is not sufficiently explained by students' reading motivation, the ability to select appropriate books, or behavioral routines. In the meta-analysis described in Chapter 2, only marginal intervention effects on reading comprehension

were found for struggling readers. In the experiments in Chapter 3, the effects of personalized expert guidance on reading attitude were smaller for reluctant readers in primary education and were absent for struggling readers in prevocational secondary education. Additionally, there were no effects on reading comprehension for students in prevocational secondary education and struggling readers in primary education. Finally, the experiments in Chapter 4 showed that nudging did not affect students who were less inclined to read. Apparently, there are additional barriers that withhold these students from reading. The studies in this dissertation do not provide conclusive evidence for what these barriers might be. However, based on previous research we assume that reading skill deficits play an important role (Merga, 2014; Soemer & Schiefele, 2018; Van Bergen et al., 2018). Students with low reading proficiency are at greater risk of having negative reading experiences. If students repeatedly have negative reading experiences, this might result in an emotional resistance toward reading (Nielen et al., 2016). Because of this emotional resistance, these students may want to avoid reading, explaining their low reading frequency.

Reading Promotion Policy

Over the last years, the Netherlands have seen a rise in attention to reading promotion. In response to the observed decrease in reading motivation and reading comprehension among both primary and secondary schoolers (Gubbels et al., 2017, 2019; Inspectorate of Education, 2022), national policymakers and advisory bodies, as well as other societal actors have urged to make reading promotion a spearhead of educational policy (Council for Culture & Dutch Educational Council, 2019; Curriculum.nu, 2019; Dutch Reading Foundation, 2020a, 2020b; Reading Coalition, 2020; Van Engelshoven & Slob, 2019). An analysis of policy documents shows that the views of these actors share a number of central tenets:

1. Stimulating reading motivation is the core of reading promotion: schools should ensure that all students learn that reading is an enjoyable activity.
2. A basic condition for effective reading promotion is the availability of a rich and varied collection, that enables students to read books matched to their reading level and interests. In schools, this implies the presence of a well-equipped school library.
3. Students need help from knowledgeable professionals, for instance in selecting appropriate books. This implies the involvement of librarians, but also requires that teachers have sufficient knowledge of recent, high-quality children's literature.
4. Reading promotion should not be limited to the educational context. Children should be exposed to books in their homes and other role models than teachers (e.g., parents and peers) may help children to increase opportunities for (leisure time) reading.
5. Much attention is needed for the reading promotion of reluctant, struggling readers.

The outcomes of the studies in this dissertation partly support the validity of these tenets. The results of the meta-analysis in Chapter 2 confirm the hypothesis that low reading motivation, and in particular a lack of interest, is one of the reasons for infrequent reading (first tenet). The experiments in Chapter 3 demonstrated that access to a diverse array of captivating books is necessary (second tenet) but insufficient for improving students' reading habits; a rich and varied selection is only helpful if they can select books that match their interests and reading level (third tenet). Although it is desirable for students to read during their leisure time (fourth tenet), motivating them to do so is complicated. The results of the studies in Chapter 4 suggest that even if students have an interest in reading, they may not automatically prioritize reading over other activities, and interventions are necessary to encourage them to do so. Finally, the combined findings of Chapters 2 through 4 underscore that hesitant readers need more customized support than their more enthusiastic peers (fifth tenet).

This dissertation also highlights some of the intricacies involved in cultivating an interest in reading. Aligning reading materials with students' interests and reading level is important but challenging. The experiments in Chapter 3 reveal that librarians are well-suited to provide guidance, given their up-to-date knowledge of children's literature (Hughes, 2013; Merga, 2019). In contrast, many teachers lack such expertise, as research indicates they do not frequently read children's literature and have limited knowledge of current collections (Applegate et al., 2014; Cremin et al., 2008; Cunningham et al., 2004; Groothengel, 2016; Kieft, 2022). While teacher education could focus more on reading promotion to address this issue (Coalition for Reading, 2020; Dutch Reading Foundation, 2020b), digital applications may be more efficient: they allow connecting students' book preferences and choices with databases of children's and youth literature, making it possible to tailor book selections to students' interests and reading level (e.g., Kurnaz et al., 2020; Nunnery et al., 2006; Shannon et al., 2015).

Encouraging students to read during their free time can be an arduous task as well. The abundance of tempting alternatives available makes attempts to promote leisure time reading difficult: even though students may be convinced about the value of reading, they likely prioritize activities that require less effort but offer more immediate rewards. Nudging might help to draw students' attention to reading, although other, more practical forms than those used in the current experiments (WhatsApp reminders) need to be explored. Book gifting—sending free books to children's homes—might be a useful alternative. A recent meta-analysis of book gifting programs during infancy indicates that these programs act as a nudge and contribute to the development of reading routines (De Bondt et al., 2020). For older students, book gifting in summer

reading programs has shown positive effects on reading achievement, particularly among students at risk of reading failure (Kim & Quinn, 2013). In the Netherlands, book gifting only targets very young children—many libraries offer BookStart to families of newborns (Van den Berg & Bus, 2014)—but it may be beneficial to extend this to students in primary and secondary education.

Possibly most important, our studies underline the difficulties of promoting reading among reluctant, struggling readers. For these students, there are additional barriers that keep them from reading, and they likely need more support. Decoding difficulties are a common struggle for many of these students, making it difficult for them to understand and enjoy texts, which may negatively impact how much they benefit from interventions (Melekoğlu & Wilkerson, 2013; Spichtig et al., 2017). It is possible that our interventions were too brief or not intensive enough to observe significant effects on reluctant, struggling readers: longer, more comprehensive interventions may be necessary. Additionally, shared reading, tutor reading, or support by audiobooks may prevent a lack of fluency disrupting the reading process and may result in positive experiences that encourage more frequent reading (Ivey, 2003; Marchessault & Larwin, 2013; Singh & Alexander, 2022; Westbrook et al., 2018).

Limitations and Future Research

The studies in this dissertation provide insight into reasons for infrequent reading and offer recommendations for reading promotion activities. However, further research is needed to obtain more knowledge of the underlying mechanisms that steered intervention effects. In Chapter 2, we concluded that reading motivation affects reading frequency. However, since only few studies included reading frequency measures, the evidence for our conclusion was indirect: it was based on the observation of intervention effects on reading comprehension (see Summary and Discussion of Main Findings). For a more precise test of our hypothesis, future studies should pay more attention to the direct effect of reading motivation on reading frequency. In the experiments on guidance of book selection in Chapter 3, it was assumed that better matching books lead to a more positive reading attitude and better reading skills. However, we have no information about the quality of the librarians' advice and students' satisfaction with the suggested books. Positive intervention effects may not only be attributable to better matching books, but also to the opportunity students had to discuss their books with a more knowledgeable other. These conversations about the books they were reading may have contributed to a more positive reading attitude as well (Chambers, 2011; Nolen, 2007). Finally, in Chapter 4 we assumed that reading becomes a more salient behavioral alternative when students or their parents receive regular reminders about reading. However, we have no information about participants'

responses after receiving a reminder and whether this immediately led to a reading activity. Information on how students and their parents responded to the nudges may provide additional insight into the impact of the nudges.

Further, the studies in this dissertation raise the question whether sustainable changes in students' reading can be made. We hypothesized that if students read more frequently—either because of more positive beliefs about reading, access to more appropriate books, or changes in behavioral routines—this incites a positive reading spiral. As a result of more frequent reading students likely improve their reading skills, which then contributes to more confident and motivated reading, and a further increase in reading frequency (Allington & McGill-Franzen, 2021; Mol & Bus, 2011; Schiefele et al., 2012; Stanovich, 1986; Toste et al., 2020). Our studies on guidance in book selection and nudges were not long enough to demonstrate such effects: we only measured short-term outcomes. Similarly, as the long-term effects of reading motivation interventions were only investigated in a couple of studies in the meta-analysis, no definitive conclusions can be drawn on whether the positive effects sustain over time. Future studies should reveal to what extent fostering reading motivation, guidance in book selection, and reminders of reading could lead to sustainable improvements in reading.

Conclusion

The aim of this dissertation was to get more insight into reasons students have for infrequent reading, and thus help reading promotors and educational policymakers in making informed decisions about how to promote students' reading effectively. The outcomes suggest that there are several reasons for infrequent reading, namely low reading motivation, a mismatch between books and students' interests and reading levels, and behavioral routines that draw students' attention away from reading. This underlines the importance of investing in students' reading motivation, looking for ways to support appropriate book selection, and finding effective ways to foster leisure time reading routines. The outcomes also stress the role professionals and parents can play in encouraging children to read, but additionally point to the importance of looking for alternative ways of guiding students when the necessary expertise is not available (e.g., when teachers or parents have too limited knowledge of children's literature). Finally, the outcomes stress the importance of more intensive or additional guidance for struggling and reluctant readers: they may need more help in finding books that match their interests and more support in developing reading routines.

It can thus be concluded that students may benefit from more guidance in selecting books and forming reading habits than is usually provided. Future studies should

reveal how this guidance could be effectively implemented in classroom practices. Digitalization seems a promising avenue: digital databases allow students access to a large variety of e-books which can be entered both at school and home; the use of reading applications can be used to gain insight into students' reading behavior and this information can then be used to help students in choosing appropriate books; and digital tools allow additional help for struggling readers, for instance in the form of audio support. Over the past few years, digital systems have been developed to provide such services (e.g., Boekies in the Netherlands). Further research is needed on how teachers can use such systems to the benefit of students, allowing them to have more positive reading experiences, ultimately resulting in more frequent, motivated, and proficient reading.

6

SUMMARY

SAMENVATTING
(SUMMARY IN DUTCH)

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APPENDICES

AUTHOR CONTRIBUTIONS

DANKWOORD
(ACKNOWLEDGEMENTS IN DUTCH)

ABOUT THE AUTHOR

LIST OF PUBLICATIONS

SUMMARY

Many students in the upper grades of primary education and in secondary education infrequently read during leisure time (Inspectorate of Education, 2022; Nippold et al., 2005; Strommen & Mates, 2004; Twenge et al., 2018; Wennekers et al., 2018). Although most of them read plenty of short texts, for example, messages on their smartphones, they spend little time reading longer texts, such as books, newspapers, or magazines. Further, many students do not effectively use the time scheduled for reading at school (Reutzel et al., 2010). This could have negative consequences for their reading proficiency, as more frequent reading is related to more fluent reading, a larger vocabulary, and better reading comprehension skills (Allington & McGill-Franzen, 2021; Mol, 2022; Mol & Bus, 2021). Therefore, the aim of this dissertation was to investigate possible reasons for infrequent reading; such information can then provide the foundation for effective reading promotion activities. In five studies, discussed in three subsequent chapters, reading motivation, the selection of appropriate books, and behavioral routines are investigated as explanations for infrequent reading.

Summary of the Studies

Chapter 2 focused on low reading motivation as an explanation of infrequent reading. Negative beliefs about reading may incite a downward spiral: students with low reading motivation read less often, which negatively influences their reading development. As a consequence, they may have more negative reading experiences, resulting in an even lower inclination toward reading (Guthrie & Davis, 2003; Morgan et al., 2009; Schaffner et al., 2013; Schiefele et al., 2012; Stanovich, 1986). A meta-analysis was conducted to investigate to what extent fostering reading motivation contributes to higher reading motivation and, as a consequence of more frequent reading, to better reading skills.

A literature search was conducted with search terms for reading, motivation, and interventions. This resulted in 7889 titles, of which 39 studies met all inclusion criteria. These studies were included in the meta-analysis and coded according to a scheme containing characteristics of the intervention, the sample, the study, and the measurements used.

The interventions had a small, positive mean effect on reading motivation and reading comprehension. Interventions that aimed to trigger students' interest had the largest effects on both reading motivation and reading comprehension. Further, larger effects on motivation were found if the duration of the intervention was longer and if the percentage of boys in the sample was higher. Interventions delivered by researchers had larger effects on reading comprehension than interventions delivered by teachers.

Effects on reading comprehension were larger for students in primary education than for students in secondary education. Finally, larger effects on reading comprehension were found for typical readers than for struggling readers.

We view the outcomes of the meta-analysis as support for the hypothesis that reading motivation is an explanation for infrequent reading: we assume that triggering positive beliefs about reading resulted in better reading skills because more motivated students read more frequently (Kavanagh, 2019; Schaffner et al., 2013; Schiefele et al., 2012; Stutz et al., 2016). The outcome that particularly interventions that triggered students' interest led to positive effects indicates that infrequent reading as a consequence of low reading motivation could be explained by the fact that students are often confronted with texts that do not match their interests.

Chapter 3 focused on the selection of appropriate books as an explanation for infrequent reading. In many schools, a large and attractive collection of books is provided and time is scheduled for independent silent reading, during which students read self-selected books (Garan & DeVoogd, 2008; Krashen, 2006; Manning et al., 2010). However, many students have ineffective selection strategies, so they do not succeed in selecting appropriate books, which may lead to negative reading experiences (Locher et al., 2019; Merga & Roni, 2017; Mohr, 2006; Reutzel et al., 2010). These students may benefit from help in selecting books matching their reading level and interests. This may lead to more positive reading experiences and, consequently, contribute to a higher reading frequency. In two studies, we investigated whether personalized expert guidance in selecting books leads to a more positive reading attitude, higher familiarity with book titles, and better reading comprehension.

Study 1 focused on students in Grades 7 and 8 of prevocational secondary education (N = 136) and Study 2 focused on students in Grades 4 to 6 of primary education (N = 99). Students in the experimental condition had biweekly meetings with a librarian about their book choices. During these meetings, the librarian and student first completed a checklist about the book the student was reading. Based on this information, the librarian suggested new books to the students. Students in the control condition self-selected books for independent silent reading.

In prevocational secondary education, a positive effect of personalized expert guidance in book selection was found on students' reading attitudes, which was limited to students who were relatively advanced in reading. In primary education, guidance in book selection positively influenced reading attitudes, in particular of those students

who already had a positive reading attitude at pretest. For the most proficient readers, a positive effect on reading comprehension was found as well.

These outcomes support the hypothesis that difficulties in selecting books are an explanation for infrequent reading. As a consequence of better access to books that matched their reading levels and interests, students probably had more positive reading experiences, which led to a more positive reading attitude. This likely resulted in more practice, so (at least in Grades 4-6) part of the students improved their reading proficiency as well. In both studies, students with a more positive reading attitude and higher reading proficiency appeared to benefit most from guidance in book selection. These students were able to read more books during the intervention period, so they could have more meaningful conversations with the librarians and get more help in selecting books. Further, limited reading proficiency may have been a barrier to positive reading experiences for struggling readers (Melekoğlu & Wilkerson, 2013; Soemer & Schiefele, 2018; Spichtig et al., 2017). For these students, additional guidance during reading may be needed.

Chapter 4 focused on behavioral routines as an explanation for infrequent reading. The choice for leisure time activities may not only be the result of conscious decisions but also be influenced by automatic, 'fast' decisions (Kahneman, 2011). Activities such as gaming and social media may easily attract students' attention, at the expense of activities such as reading (Nippold et al., 2004; Willingham, 2017). These automatic decisions may be influenced by means of nudging (Thaler & Sunstein, 2008), for example in the form of reminders (Carlzolari & Nardatto, 2017; Sunstein, 2014). In two studies, we tested whether regular reminders of reading lead to a more positive reading attitude, higher familiarity with books, and better reading comprehension.

Study 1 focused on students in Grades 4 to 6 of primary education ($N = 105$) and Study 2 focused on students in Grades 7 and 8 of prevocational secondary education ($N = 146$). In both studies, three conditions were compared: 1) a nudge condition, in which students or their parents received information about the importance of reading once and reminders of reading twice a week, 2) an information condition, in which students or their parents only received information about the importance of reading once, and 3) a control condition, in which students or their parents received neither information nor reminders.

In primary education, the nudges positively influenced parents' familiarity with book titles and children's reading attitudes. A positive effect on students' familiarity with books was found in prevocational secondary education. All effects were limited to

parents and students most prone to reading. For the majority of the students, nudges did not lead to positive outcomes.

The outcomes of the study provide partial support for the hypothesis that behavioral routines can explain infrequent reading. The nudges altered the reading routines of parents and students most prone to reading. For parents and students who were less willing to read, the nudges did not lead to more frequent reading. This may be explained by the nature of the reminders. The aim of the reminders was not to convince parents or students about the importance of reading but to bring reading to their attention and facilitate the choice for reading (Thaler & Sunstein, 2008).

Reading Promotion Policy

The studies in this dissertation have several implications for reading promotion policy. The results of the meta-analysis in Chapter 2 confirm the importance of fostering students' reading motivation, the outcomes of the studies in Chapter 3 indicate the importance of access to appropriate books, and the results of the experiments in Chapter 4 suggest that students' decision to read (or not) is partly a result of behavioral routines. Hence, reading promoters should look for ways to stirring positive beliefs about reading, helping students in selecting books that match their reading level and interests, and bringing reading to students' attention as a behavioral alternative to prevent them from giving priority to other, more appealing activities.

The outcomes of this dissertation also highlight some challenges in reading promotion policy and implementing this policy in practice. In the studies in Chapter 3, students received guidance from librarians in selecting books, who are assumed to have up-to-date knowledge of children's literature (Hughes, 2013; Merga, 2019). Many teachers, however, lack this expertise, so they are less capable of helping students to select appropriate books (Applegate et al., 2013; Cremin et al., 2008; Cunningham et al., 2004; Groothengel, 2016; Kieft, 2022). This underlines the importance of paying sufficient attention to reading promotion in teacher education (Coalition for Reading, 2020; Dutch Reading Foundation, 2020b). Further, the use of digital applications may be a useful addition to building teacher expertise: by connecting information about students' reading behavior and preferences to databases of children's and youth literature, books may be easily recommended matched to students' reading level and interests (e.g., Kurnaz et al., 2020; Nunnery et al., 2006; Shannon et al., 2015).

In the experiments in Chapter 4, WhatsApp reminders were used to make reading a more salient behavioral alternative, but other forms of nudging may be more suitable to be used in practice. Book gifting, in which free books are sent to children's homes,

may be a useful alternative. A meta-analysis of book gifting during infancy shows that book gifting programs contribute to the development of reading routines (De Bondt et al., 2020). In the Netherlands, book gifting only targets young children, but it may be equally beneficial to introduce book gifting as a way to stimulate leisure time reading of primary and secondary school students (e.g., Kim & Quinn, 2013).

Finally, the studies in this dissertation indicate the difficulties of promoting reading among reluctant, struggling readers. Decoding difficulties may be a barrier to the understanding and enjoyment of texts (Melekoğlu & Wilkerson, 2013; Spichtig et al., 2017). Longer or more intensive interventions may be needed to generate effects on struggling readers as well. Further, guidance during reading, for example, shared reading, tutor reading, or support by audiobooks, may prevent poor reading skills from disrupting the reading process (Ivey, 2003; Marchessault & Larwin, 2013; Singh & Alexander, 2022; Westbrook et al., 2018). As a consequence, students may have more positive reading experiences that encourage further reading.

Limitations and Future Research

The studies in this dissertation contribute to insight into reasons for infrequent reading. Further research is needed to get more insight into the underlying mechanisms that steered intervention effects. In the meta-analysis in Chapter 2, we assumed that positive effects on reading comprehension were the result of more frequent reading. However, as only a few studies examined the effects on reading frequency, we were not able to test the direct effect of promoting reading motivation on reading frequency. In the studies on book selection in Chapter 3, we have no information about the quality of the librarians' advice and children's satisfaction with the recommended books. Possibly, intervention effects are not only the result of better matching books but also of the opportunity students had to talk about their books (Chamers, 2011; Nolen, 2007). In the studies on nudging in Chapter 4, we have no information about participants' responses to the reminders and whether this immediately led to a reading activity. By paying more attention to participants' responses in further studies, more insight could be gained into the effects of nudging.

The studies in this dissertation raise the question of whether sustainable changes in students' reading behavior can be made. If students read more frequently, this may contribute to a positive reading spiral, in which students improve their reading skills and have more positive reading experiences, which may lead to higher reading motivation and a further increase in reading frequency (Allington & McGill-Franzen, 2021; Mol & Bus, 2011; Schiefele et al., 2012; Stanovich, 1986; Toste et al., 2020). In our studies on guidance in book selection and nudging, we only examined short-term effects. As

long-term effects were only investigated in a couple of studies that were included in the meta-analysis, we cannot draw definitive conclusions on whether positive effects sustain over time. Further research is needed to get more insight into the effects of reading promotion in the longer term.

Conclusion

The aim of this dissertation was to get more insight into possible explanations for infrequent reading. The outcomes reveal that several factors play a role in infrequent reading, namely low reading motivation, difficulties in selecting appropriate books, and behavioral routines. Based on this dissertation, it can be concluded that students need more guidance during reading than is usually provided. This guidance should be focused on fostering students' reading motivation, helping in selecting books, or bringing reading to students' attention. Further, the results of this dissertation indicate the importance of more intensive or additional guidance for struggling, reluctant readers. They may need more support in order to prevent reading difficulties from turning reading into an activity that evokes resistance.

Future studies could reveal how this guidance could be implemented in practice. Digital media may offer promising opportunities. Databases with e-books may provide access to a large and attractive collection of books, both at school and at home. Digital applications could offer insight into students' reading behavior, which may guide the selection of new books. Further, additional guidance could be provided to struggling readers, for example in the form of audio support during reading. Future research is needed to reveal how teachers may implement this in practice, so students have more positive reading experiences, that result in more frequent, more motivated, and more proficient reading.

SAMENVATTING (SUMMARY IN DUTCH)

Veel leerlingen in de bovenbouw van het basisonderwijs en in het voortgezet onderwijs lezen weinig in hun vrije tijd (Inspectie van het onderwijs, 2022; Nippold et al., 2005; Strommen & Mates, 2004; Twenge et al., 2018; Wennekers et al., 2018). Hoewel de meeste leerlingen regelmatig korte teksten lezen, bijvoorbeeld berichten op hun smartphone, lezen ze weinig langere teksten, zoals boeken, kranten of tijdschriften. Daarnaast maken leerlingen niet altijd optimaal gebruik van de tijd die op school wordt ingeroosterd om te lezen (Reutzel et al., 2010). Dit kan negatieve gevolgen hebben voor hun leesvaardigheid, aangezien een hogere leesfrequentie gerelateerd is aan een betere technische leesvaardigheid, een grotere woordenschat en beter leesbegrip (Allington & McGill-Franzen, 2021; Mol, 2022; Mol & Bus, 2021). Het doel van dit proefschrift was daarom om mogelijke verklaringen van infrequent lezen te onderzoeken. Deze informatie kan biedt aanknopingspunten voor effectieve leesbevorderingsactiviteiten. In vijf studies, die worden beschreven in drie opeenvolgde hoofdstukken, worden leesmotivatie, de selectie van geschikte boeken en gedragsroutines als verklaring van infrequent lezen onderzocht.

Samenvatting van de Studies

Hoofdstuk 2 focuste op een lage leesmotivatie als verklaring van infrequent lezen. Negatieve opvattingen over lezen kunnen leiden tot een neerwaartse spiraal: leerlingen met een lage leesmotivatie lezen minder vaak, waardoor hun leesvaardigheid minder ontwikkelt. Als gevolg daarvan zullen zij mogelijk vaker negatieve leeservaringen opdoen, wat kan leiden tot een verdere daling van de leesmotivatie (Guthrie & Davis, 2003; Morgan et al., 2009; Schaffner et al., 2013; Schiefele et al., 2012; Stanovich, 1986). Met behulp van een meta-analyse hebben we onderzocht in hoeverre het bevorderen van de leesmotivatie bijdraagt aan een hogere leesmotivatie en, als gevolg van vaker lezen, een betere leesvaardigheid.

We hebben een online zoekopdracht uitgevoerd met zoektermen voor lezen, motivatie en interventies. Dit leidde tot 7889 resultaten, waarvan 39 studies voldeden aan alle inclusiecriteria. Deze studies zijn opgenomen in de meta-analyse en gecodeerd aan de hand van een codeerschema met daarin kenmerken van de interventie, de steekproef, de studie en de gebruikte meetinstrumenten.

De interventies hadden een klein, positief gemiddeld effect op leesmotivatie en leesbegrip. Interventies gericht op het stimuleren van de interesse hadden de grootste effecten op leesmotivatie en leesbegrip. Daarnaast waren de effecten op motivatie groter wanneer de interventie langer duurde en het percentage jongens

in de steekproef groter was. Interventies die werden uitgevoerd door onderzoekers hadden grotere effecten op leesbegrip dan interventies die werden uitgevoerd door leerkrachten. De effecten op leesbegrip waren groter voor leerlingen in het basisonderwijs dan voor leerlingen in het voortgezet onderwijs. Tot slot waren de effecten op leesbegrip groter voor leerlingen met een gemiddelde leesvaardigheid dan voor leerlingen met een lage leesvaardigheid.

De uitkomsten van de meta-analyse ondersteunen de hypothese dat leesmotivatie een verklaring is van infrequent lezen: we gaan ervan uit dat het bevorderen van positieve opvattingen over lezen resulteerde in een hogere leesvaardigheid, doordat meer gemotiveerde leerlingen vaker lezen (Kavanagh, 2019; Schaffner et al., 2013; Schiefele et al., 2012; Stutz et al., 2016). Het feit dat met name interventies die gericht waren op het stimuleren van de interesse positieve effecten hadden, geeft aan dat infrequent lezen als gevolg van een lage leesmotivatie vooral verklaard kan worden doordat leerlingen vaak teksten moeten lezen die niet aansluiten bij hun interesses.

Hoofdstuk 3 richtte zich op de selectie van geschikte boeken als verklaring voor infrequent lezen. Op veel scholen wordt geïnvesteerd in een uitgebreide en aantrekkelijke boekencollectie en wordt regelmatig tijd besteed aan vrij lezen, waarbij leerlingen lezen in zelfgekozen boeken (Garan & DeVoogd, 2008; Krahen, 2006; Manning et al., 2010). Veel leerlingen gebruiken echter geen effectieve selectie-strategieën bij het selecteren van boeken, waardoor zij er niet in om geschikte boeken te kiezen, wat kan leiden tot negatieve leeservaringen (Locher et al., 2019; Merga & Roni, 2017; Mohr, 2006; Reutzel et al., 2010). Deze leerlingen zouden baat kunnen hebben bij begeleiding voor het selecteren van boeken aansluitend bij hun leesniveau en interesses. Als gevolg hiervan doen leerlingen mogelijk meer positieve leeservaringen op, wat kan bijdragen aan een hogere leesfrequentie. In twee studies hebben we onderzocht of begeleiding bij het kiezen van boeken leidt tot een positievere leesattitude, meer bekendheid met boeken en beter leesbegrip.

Studie 1 focuste op leerlingen in leerjaar 1 en 2 van het vmbo (N = 136) en studie 2 op leerlingen in groep 6, 7 en 8 van het basisonderwijs (N = 99). Leerlingen in de experimentele conditie hadden eens per twee weken een gesprek met een leesconsulent over hun boekenkeuze. Tijdens dit gesprek vulden de leesconsulent en leerling eerst een checklist in over het boek dat de leerling aan het lezen was. Op basis daarvan raadde de leesconsulent nieuwe boeken aan. Leerlingen in de controle conditie kozen zelf hun boeken voor vrij lezen.

Op het vmbo was er een positief effect van hulp bij de boekenkeuze op de leesattitude van leerlingen met een relatief hoge leesvaardigheid. In het basisonderwijs was er een positief effect op de leesattitude, met name voor leerlingen die al een positieve leesattitude hadden tijdens de voormeting. Voor de meest vaardige lezers was er daarnaast een positief effect op leesbegrip.

Deze resultaten bevestigen de hypothese dat moeite bij het selecteren van geschikte boeken een verklaring vormt voor infrequent lezen. Door betere toegang tot boeken die aansluiten bij hun leesniveau en interesse hebben leerlingen waarschijnlijk meer positieve leeservaringen opgedaan, wat heeft geresulteerd in een positievere leesattitude. Dit heeft er vermoedelijk toe geleid dat leerlingen vaker zijn gaan lezen, waardoor (ten minste in groep 6-8) bij een deel van de leerlingen ook de leesvaardigheid verbeterde. In beide studies bleek dat leerlingen met een positieve leesattitude en betere leesvaardigheid het meest profiteerden van hulp bij de boekenkeuze. Deze leerlingen lazen meer boeken tijdens de interventieperiode, waardoor zij meer inhoudelijke gesprekken hadden met de leesconsulenten en meer hulp kregen bij het kiezen van nieuwe boeken. Daarnaast stond de beperkte leesvaardigheid van zwakke lezers het opdoen van positieve leeservaringen mogelijk in de weg (Melekoğlu & Wilkerson, 2013; Soemer & Schiefele, 2018; Spichtig et al., 2017). Voor deze leerlingen is wellicht aanvullende begeleiding tijdens het lezen nodig.

Hoofdstuk 4 focuste op gedragsroutines als verklaring van infrequent lezen. De keuze om wel of niet te lezen is mogelijk niet altijd een bewuste, weloverwogen keuze, maar kan ook worden beïnvloed door automatische, snelle beslissingen (Kahneman, 2011). Andere activiteiten, bijvoorbeeld gamen en social media, kunnen makkelijk de aandacht van leerlingen trekken, wat ten koste kan gaan van activiteiten als lezen (Nippold et al., 2005; Willingham, 2017). Deze snelle beslissingen kunnen beïnvloed worden door middel van nudging (Thaler & Sunstein, 2008), bijvoorbeeld in de vorm van herinneringen (Carlzolari & Nardatto, 2017; Sunstein, 2014). In twee studies hebben we onderzocht of regelmatige herinneringen via WhatsApp, die het lezen onder de aandacht brengen, leiden tot een positievere leesattitude, meer bekendheid met boeken en beter leesbegrip.

Studie 1 focuste op leerlingen in groep 6, 7 en 8 van het basisonderwijs (N = 105) en studie 2 op leerlingen in leerjaar 1 en 2 van het vmbo (N = 146). In beide studies werden drie condities met elkaar vergeleken: 1) een nudge-conditie, waarin leerlingen of hun ouders eenmalig informatie over het belang van lezen ontvingen en vervolgens tweemaal per week een herinnering kregen, 2) een informatie-conditie, waarin leerlingen of hun ouders alleen eenmalig informatie over het belang van lezen

ontvingen en 3) een controleconditie, waarin leerlingen en hun ouders geen informatie en geen herinneringen ontvingen.

In het basisonderwijs was er een positief effect van nudging op kennis van kinderboeken bij ouders en op de leesattitude van leerlingen. In het vmbo was er een positief effect op de bekendheid met boeken van leerlingen. Alle effecten beperkten zich tot leerlingen en ouders die het meest geneigd waren om te lezen. Voor de meerderheid van de leerlingen leidde nudging niet tot positieve uitkomsten.

De resultaten bieden gedeeltelijke ondersteuning voor de hypothese dat gedragsroutines een verklaring zijn voor infrequent lezen. De herinneringen hebben bijgedragen aan de keuze om te lezen voor ouders en leerlingen die al het meest geneigd waren om te lezen. Voor ouders en leerlingen die minder welwillend tegenover lezen stonden, hebben de herinneringen niet geleid tot frequenter lezen. Dit kan worden verklaard door het feit dat het doel van de herinneringen niet was om ouders of leerlingen overtuigen van het belang van lezen, maar om lezen onder de aandacht te brengen en daarmee de keuze voor lezen te vergemakkelijken (Thaler & Sunstein, 2008).

Leesbevorderingsbeleid

De studies in dit proefschrift bieden verschillende aanknopingspunten voor leesbevorderingsbeleid. Allereerst onderstrepen de resultaten van de meta-analyse in hoofdstuk 2 het belang van investeren in de leesmotivatie, de uitkomsten van de experimenten in hoofdstuk 3 wijzen op het belang van toegang tot geschikte boeken en de resultaten van de studies in hoofdstuk 4 suggereren dat de keuze van leerlingen om te lezen (of niet) deels het gevolg is van gedragsroutines. Dit impliceert dat leesbevorderaars moeten zoeken naar manieren om positieve opvattingen over lezen te bevorderen, om leerlingen te helpen bij het zoeken naar boeken die aansluiten bij hun leesniveau en interesses en om lezen bij leerlingen onder de aandacht te brengen.

De uitkomsten van dit proefschrift wijzen ook op verschillende uitdagingen voor leesbevorderingsbeleid en het implementeren van dit beleid in de praktijk. In de studies in hoofdstuk 3 werden leerlingen begeleid door leesconsulenten bij het kiezen van boeken, van wie kan worden aangenomen dat zij goed op de hoogte zijn van de actuele collectie van kinderboeken (Hughes, 2013; Merga, 2019). Veel leerkrachten hebben deze kennis echter niet, waardoor zij leerlingen minder goed kunnen ondersteunen bij het kiezen van geschikte boeken (Applegate et al., 2013; Cremin et al., 2008; Cunningham et al., 2004; Groothengel, 2016; Kieft, 2022). Dit onderstreept het belang van voldoende aandacht voor leesbevordering in lerarenopleidingen (De

Leescoalitie, 2020; Dutch Reading Foundation, 2020b). Daarnaast kan het gebruik van digitale applicaties een nuttige aanvulling zijn: door informatie over het leesgedrag en de leesvoorkeuren van leerlingen te koppelen aan databases met kinder- en jeugdliteratuur, kunnen boeken worden aanbevolen die aansluiten bij het leesniveau en de interesses van leerlingen (bv. Kurnaz et al., 2020; Nunnery et al., 2006; Shannon et al., 2015).

In de experimenten in hoofdstuk 4 hebben we gebruik gemaakt van herinneringen via WhatsApp om het lezen onder de aandacht te brengen, maar wellicht zijn andere vormen van nudging meer geschikt voor gebruik in de praktijk. Boekgiftprogramma's, waarbij leerlingen thuis regelmatig nieuwe boeken ontvangen, kunnen een goed alternatief zijn. Uit een meta-analyse naar boekgiftprogramma's bij gezinnen met jonge kinderen blijkt dat dit kan bijdragen aan de vorming van leesroutines (De Bondt et al., 2020). In Nederland worden boekgiftprogramma's alleen ingezet bij jonge kinderen, in de vorm van Boekstart (Van den Berg & Bus, 2014). Ook voor leerlingen in het basis en voorgezet onderwijs zou dit echter kunnen bijdragen aan het bevorderen van lezen in de vrije tijd (bv. Kim & Quinn, 2013).

Tot slot wijzen de studies in dit proefschrift op de uitdagingen van leesbevordering bij zwakke, onwillige lezers. Moeilijkheden bij het decoderen kunnen het begrijpen van teksten en het ervaren van leesplezier in de weg staan (Melekoğlu & Wilkerson, 2013; Spichtig et al., 2017). Langere of intensievere interventies kunnen nodig zijn om ook bij zwakke lezers positieve uitkomsten te bereiken. Daarnaast kan ondersteuning tijdens het lezen, bijvoorbeeld in de vorm van voorlezen, tutor lezen of audio-ondersteuning, voorkomen dat een gebrekkige leesvaardigheid het leesproces verstoort (Ivey, 2003; Marchessault & Larwin, 2013; Singh & Alexander, 2022; Westbrook et al., 2018). Als gevolg hiervan zouden leerlingen meer positieve leeservaringen kunnen opdoen, die hen aanmoedigen om vaker te lezen.

Limitaties en Vervolgonderzoek

Met de studies in dit proefschrift is inzicht verkregen in redenen voor infrequent lezen. Aanvullend onderzoek is echter nodig om meer zicht te krijgen op de onderliggende mechanismen die tot positieve interventie-effecten hebben geleid. In de meta-analyse in hoofdstuk 2 veronderstelden we dat de positieve effecten op leesbegrip het gevolg waren van een hogere leesfrequentie. Omdat effecten op leesfrequentie slechts in een klein deel van de studies werd onderzocht, waren we echter niet in staat om het directe effect van leesmotivatiebevordering op leesfrequentie te onderzoeken. In de studies naar hulp bij de boekenkeuze in hoofdstuk 3 hebben we beperkte informatie over de kwaliteit van het advies van de leesconsulenten en de tevredenheid van

leerlingen met de aanbevolen boeken. Mogelijk hebben niet alleen beter passende boeken, maar ook de gelegenheid om over hun boeken te praten, geleid tot positieve interventie-effecten bij leerlingen (Chambers, 2011; Nolen, 2007). In de studies naar nudging in hoofdstuk 4 hebben we geen informatie over de reactie van de leerlingen en ouders op de herinneringen en of dit onmiddellijk leidde tot een leesactiviteit. Door hier in vervolgonderzoek aandacht aan te besteden, kan meer inzicht verkregen worden in de werking van nudges.

Daarnaast roepen de studies in dit proefschrift de vraag op in hoeverre duurzame veranderingen in het leesgedrag van leerlingen gemaakt kunnen worden. Wanneer leerlingen vaker gaan lezen, zou dit kunnen leiden tot een positieve leesspiraal, waarbij leerlingen hun leesvaardigheid verbeteren en meer positieve leeservaringen opdoen, waardoor hun leesmotivatie toeneemt en zij nog vaker zullen lezen (Allington & McGill-Franzen, 2021; Mol & Bus, 2011; Schiefele et al., 2012; Stanovich, 1986; Toste et al., 2020). In de studies naar hulp bij de boekenkeuze en nudging hebben we alleen kortetermijneffecten onderzocht. Langetermijneffecten werden maar in een klein deel van de studies in de meta-analyse onderzocht, waardoor we geen definitieve conclusies kunnen trekken over of effecten blijvend zijn. Vervolgonderzoek is nodig om meer zicht te krijgen op de effecten van leesbevordering op de langere termijn.

Conclusie

Het doel van dit proefschrift was om meer inzicht te krijgen in mogelijke verklaringen voor infrequent lezen. De uitkomsten tonen aan dat er verschillende factoren een rol spelen bij infrequent lezen, namelijk een lage leesmotivatie, moeite bij het kiezen van geschikte boeken en gedragsroutines. Op basis van dit proefschrift kunnen we concluderen dat leerlingen meer ondersteuning nodig hebben bij het lezen dan doorgaans wordt geboden. Deze ondersteuning moet gericht zijn op het bevorderen van de leesmotivatie, het bieden van begeleiding bij het kiezen van boeken en het onder de aandacht brengen van lezen. Bovendien wijzen de resultaten van dit proefschrift op het belang van intensievere of aanvullende begeleiding voor zwakke, onwillige lezers. Zij hebben mogelijk meer ondersteuning nodig om te voorkomen dat moeilijkheden tijdens het lezen ertoe leiden dat lezen een activiteit wordt die weerstand oproept.

Vervolgonderzoek moet uitwijzen hoe deze begeleiding in de praktijk kan worden vormgegeven. De inzet van digitale media kan daarbij veelbelovende mogelijkheden bieden. Databases met e-books kunnen zowel op school als thuis toegang bieden tot een uitgebreide en aantrekkelijke boekencollectie. Met digitale applicaties kan inzicht worden verkregen in het leesgedrag van leerlingen, op basis waarvan suggesties voor

nieuwe boeken gedaan kunnen worden. Bovendien kan aanvullende begeleiding worden geboden aan zwakke lezers, bijvoorbeeld in de vorm van audio-ondersteuning tijdens het lezen. Aanvullend onderzoek is nodig om na te gaan hoe leerkrachten dit in de praktijk kunnen inzetten, zodat leerlingen meer positieve leeservaringen opdoen, wat kan resulteren in vaker, gemotiveerder en vaardiger lezen.

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APPENDICES

Appendix 2A: Search Strategy for Meta-analysis of Reading Motivation Interventions.

Embase.com

(reading/de OR (reading OR read OR reader*):ab,ti) AND ('intervention study'/exp OR 'education program'/exp OR 'program development'/exp OR 'program effectiveness'/exp OR 'program efficacy'/exp OR 'program evaluation'/exp OR training/de OR teaching/de OR 'educational model'/de OR 'follow up'/exp OR 'early childhood intervention'/exp OR 'clinical trial'/exp OR (intervention* OR program* OR train* OR support* OR therap* OR treat* OR instruct* OR teach* OR taught OR (follow* NEXT/1 up*) OR followup* OR (earl* NEAR/3 educat*) OR trial* OR random* OR (education* NEAR/3 model*) OR reward* OR incentive*):ab,ti) AND (motivation/exp OR (motivat* OR unmotivat* OR amotivat* OR (Interest* NEAR/6 (personal* OR individual* OR situation*)) OR (read* NEAR/3 (attitude* OR dislike* OR enjoy* OR joy OR enthusias*))):ab,ti) AND (child/exp OR newborn/exp OR adolescent/exp OR adolescence/exp OR 'child behavior'/de OR 'child parent relation'/de OR childhood/exp OR 'child development'/de OR 'child psychology'/de OR school/de OR 'nuclear family'/exp OR 'child parent relation'/exp OR 'extended family'/exp OR grandchild/de OR grandparent/de OR (adolescen* OR infan* OR newborn* OR (new NEXT/1 born*) OR baby OR babies OR neonat* OR child* OR kid OR kids OR toddler* OR teen* OR boy* OR girl* OR minors OR underag* OR (under NEXT/1 (age* OR aging)) OR juvenil* OR youth* OR kindergar* OR puber* OR pubescen* OR prepubescen* OR prepubert* OR school* OR preschool* OR highschool* OR pupil* OR (class NOT ('social class')) OR Classroom* OR parent* OR father* OR mother* OR grandparent* OR grandfather* OR grandmother* OR grandchild* OR ((nuclear OR extended*) NEXT/1 famil*)):ab,ti) NOT ('health literacy'/exp OR ('health literacy'):ab,ti) NOT ([Conference Abstract]/lim OR [Letter]/lim OR [Note]/lim OR [Editorial]/lim)

Medline (Ovid)

(reading/ OR (reading OR read OR reader*).ab,ti.) AND ("Intervention Studies"/ OR "program development"/ OR "program evaluation"/ OR teaching/ OR "Models, Educational"/ OR "Follow-Up Studies"/ OR "Early Intervention (Education)"/ OR (intervention* OR program* OR train* OR support* OR therap* OR treat* OR instruct* OR teach* OR taught OR (follow* ADJ up*) OR followup* OR (earl* ADJ3 educat*) OR (social ADJ3 interact*) OR trial* OR random* OR (education* ADJ3 model*) OR reward* OR incentive*).ab,ti.) AND (motivation/ OR (motivat* OR unmotivat* OR amotivat* OR (Interest* ADJ6 (personal* OR individual* OR situation*)) OR (read* ADJ3 (attitude* OR dislike* OR enjoy* OR joy OR enthusias*))).ab,ti.) AND (exp child/ OR exp infant/ OR

adolescent/ OR schools/ OR exp “nuclear family”/ OR exp “Parent-Child Relations “/ OR Parenting/ OR (adolescen* OR infan* OR newborn* OR (new ADJ born*) OR baby OR babies OR neonat* OR child* OR kid OR kids OR toddler* OR teen* OR boy* OR girl* OR minors OR underag* OR (under ADJ (age* OR aging)) OR juvenil* OR youth* OR kindergar* OR puber* OR pubescen* OR prepubescen* OR prepubert* OR school* OR preschool* OR highschool* OR pupil* OR (class NOT (“social class”)) OR Classroom* OR parent* OR father* OR mother* OR grandparent* OR grandfather* OR grandmother* OR grandchild* OR ((nuclear OR extended*) ADJ famil*)).ab,ti.) NOT (“health literacy”/ OR (“health literacy”).ab,ti.) NOT (letter OR news OR comment OR editorial OR congresses OR abstracts).pt.

PsycINFO (Ovid)

(reading/ OR “Reading Achievement”/ OR “Reading Comprehension”/ OR “Reading Development”/ OR “Reading Education”/ OR “Reading Materials”/ OR “Reading Measures”/ OR “Reading Skills”/ OR “Reading Speed”/ OR (reading OR read OR reader*).ab,ti.) AND (“Intervention”/ OR “program development”/ OR “program evaluation”/ OR teaching/ OR “Teaching Methods”/ OR “FollowUp Studies”/ OR “Early Intervention”/ OR “Motivation Training”/ OR (intervention* OR program* OR train* OR support* OR therap* OR treat* OR instruct* OR teach* OR taught OR (follow* ADJ up*) OR followup* OR (earl* ADJ3 educat*) OR trial* OR random* OR (education* ADJ3 model*) OR reward* OR incentive*).ab,ti.) AND (motivation/ OR “Educational Incentives”/ OR “Extrinsic Motivation”/ OR “Intrinsic Motivation”/ OR “Motivation Training”/ OR (motivat* OR unmotivat* OR amotivat* OR (Interest* ADJ6 (personal* OR individual* OR situation*)) OR (read* ADJ3 (attitude* OR dislike* OR enjoy* OR joy OR enthusias*))).ab,ti.) AND (100.ag. OR 200.ag. OR schools/ OR “Elementary Schools”/ OR “High Schools”/ OR “Junior High Schools”/ OR Kindergartens/ OR “Middle Schools”/ OR exp “nuclear family”/ OR (adolescen* OR infan* OR newborn* OR (new ADJ born*) OR baby OR babies OR neonat* OR child* OR kid OR kids OR toddler* OR teen* OR boy* OR girl* OR minors OR underag* OR (under ADJ (age* OR aging)) OR juvenil* OR youth* OR kindergar* OR puber* OR pubescen* OR prepubescen* OR prepubert* OR school* OR preschool* OR highschool* OR pupil* OR (class NOT (“social class”)) OR Classroom* OR parent* OR father* OR mother* OR grandparent* OR grandfather* OR grandmother* OR grandchild* OR ((nuclear OR extended*) ADJ famil*)).ab,ti.) NOT (“health literacy”/ OR (“health literacy”).ab,ti.) NOT (letter* OR news OR comment* OR editorial* OR congres* OR abstract* OR book* OR chapter* OR dissertation abstract*).pt.

Cinahl ebsco

(MH reading+ OR TI (reading OR read OR reader*) OR AB (reading OR read OR reader*)) AND (MH “Experimental Studies” OR MH “program development+” OR MH “program

evaluation+" OR MH teaching+ OR MH "Models, Educational+" OR MH "Prospective Studies+" OR MH "Early Intervention+" OR TI (intervention* OR program* OR train* OR support* OR therap* OR treat* OR instruct* OR teach* OR taught OR (follow* N1 up*) OR followup* OR (earl* N2 educat*) OR trial* OR random* OR (education* N2 model*) OR reward* OR incentive*)) AND (MH motivation+ OR (motivat* OR unmotivat* OR amotivat* OR (Interest* N5 (personal* OR individual* OR situation*)) OR (read* N2 (attitude* OR dislike* OR enjoy* OR joy OR enthusias*))) OR AB (intervention* OR program* OR train* OR support* OR therap* OR treat* OR instruct* OR teach* OR taught OR (follow* N1 up*) OR followup* OR (earl* N2 educat*) OR trial* OR random* OR (education* N2 model*) OR reward* OR incentive*)) AND (MH motivation+ OR TI (motivat* OR unmotivat* OR amotivat* OR (Interest* N5 (personal* OR individual* OR situation*)) OR (read* N2 (attitude* OR dislike* OR enjoy* OR joy OR enthusias*))) OR AB (motivat* OR unmotivat* OR amotivat* OR (Interest* N5 (personal* OR individual* OR situation*)) OR (read* N2 (attitude* OR dislike* OR enjoy* OR joy OR enthusias*)))) AND (MH child+ OR MH adolescence+ OR MH schools+ OR MH "nuclear family+" OR MH "Extended Family+" OR MH "Parent-Child Relations +" OR MH Parenting+ OR TI (adolescen* OR infan* OR newborn* OR (new N1 born*) OR baby OR babies OR neonat* OR child* OR kid OR kids OR toddler* OR teen* OR boy* OR girl* OR minors OR underag* OR (under N1 (age* OR aging)) OR juvenil* OR youth* OR kindergar* OR puber* OR pubescen* OR prepubescen* OR prepubert* OR school* OR preschool* OR highschool* OR pupil* OR (class NOT ("social class")) OR Classroom* OR parent* OR father* OR mother* OR grandparent* OR grandfather* OR grandmother* OR grandchild* OR ((nuclear OR extended*) N1 famil*)) OR AB (adolescen* OR infan* OR newborn* OR (new N1 born*) OR baby OR babies OR neonat* OR child* OR kid OR kids OR toddler* OR teen* OR boy* OR girl* OR minors OR underag* OR (under N1 (age* OR aging)) OR juvenil* OR youth* OR kindergar* OR puber* OR pubescen* OR prepubescen* OR prepubert* OR school* OR preschool* OR highschool* OR pupil* OR (class NOT ("social class")) OR Classroom* OR parent* OR father* OR mother* OR grandparent* OR grandfather* OR grandmother* OR grandchild* OR ((nuclear OR extended*) N1 famil*))) NOT (("health literacy")) NOT PT (letter OR news OR comment OR editorial OR congresses OR abstracts OR book)
(limit to: Academic Journals)

Eric ebsco

((MH reading+ AND (MH motivation+ OR MH "Motivation Techniques+")) OR MH "Reading Attitudes+" OR MH "Reading Interests+" OR MH "Reading Motivation+" OR TI ((reading OR read OR reader*) N6 (motivat* OR unmotivat* OR amotivat* OR Interest OR attitude* OR dislike* OR enjoy* OR joy OR enthusias*)) OR AB ((reading OR read OR reader*) N6 (motivat* OR unmotivat* OR amotivat* OR Interest OR attitude* OR

dislike* OR enjoy* OR joy OR enthusias*))) AND (MH “Experiments “ OR MH “Program Development+” OR MH “Program Effectiveness+” OR MH “Program Evaluation+” OR MH “Instructional Innovation+” OR MH “Early Intervention+” OR MH “Parent Materials+” OR TI (intervention* OR program* OR train* OR support* OR therap* OR treat* OR instruct* OR teach* OR taught OR (follow* N1 up*) OR followup* OR (earl* N2 educat*) OR trial* OR random* OR (education* N2 model*) OR reward* OR incentive*) OR AB (intervention* OR program* OR train* OR support* OR therap* OR treat* OR instruct* OR teach* OR taught OR (follow* N1 up*) OR followup* OR (earl* N2 educat*) OR trial* OR random* OR (education* N2 model*) OR reward* OR incentive*)) AND (MH children+ OR MH adolescents+ OR MH schools+ OR MH “Family (Sociological Unit)+” OR MH “Parent Child Relationship+” OR MH “Parenting Styles+” OR MH Parenting+ OR MH “Child Rearing+” OR MH “Parent Materials+” OR TI (adolescen* OR infan* OR newborn* OR (new N1 born*) OR baby OR babies OR neonat* OR child* OR kid OR kids OR toddler* OR teen* OR boy* OR girl* OR minors OR underag* OR (under N1 (age* OR aging)) OR juvenil* OR youth* OR kindergar* OR puber* OR pubescen* OR prepubescen* OR prepubert* OR school* OR preschool* OR highschool* OR pupil* OR (class NOT (“social class”)) OR Classroom* OR parent* OR father* OR mother* OR grandparent* OR grandfather* OR grandmother* OR grandchild* OR ((nuclear OR extended*) N1 famil*)) OR AB (adolescen* OR infan* OR newborn* OR (new N1 born*) OR baby OR babies OR neonat* OR child* OR kid OR kids OR toddler* OR teen* OR boy* OR girl* OR minors OR underag* OR (under N1 (age* OR aging)) OR juvenil* OR youth* OR kindergar* OR puber* OR pubescen* OR prepubescen* OR prepubert* OR school* OR preschool* OR highschool* OR pupil* OR (class NOT (“social class”)) OR Classroom* OR parent* OR father* OR mother* OR grandparent* OR grandfather* OR grandmother* OR grandchild* OR ((nuclear OR extended*) N1 famil*))) NOT ((“health literacy”))
(limit to: Peer reviewed / Academic Journals)

Cochrane

((reading OR read OR reader*):ab,ti) AND ((intervention* OR program* OR train* OR support* OR therap* OR treat* OR instruct* OR teach* OR taught OR (follow* NEXT/1 up*) OR followup* OR (earl* NEAR/3 educat*) OR trial* OR random* OR (education* NEAR/3 model*) OR reward* OR incentive*):ab,ti) AND ((motivat* OR unmotivat* OR amotivat* OR (Interest* NEAR/6 (personal* OR individual* OR situation*)) OR (read* NEAR/3 (attitude* OR dislike* OR enjoy* OR joy OR enthusias*))):ab,ti) AND ((adolescen* OR infan* OR newborn* OR (new NEXT/1 born*) OR baby OR babies OR neonat* OR child* OR kid OR kids OR toddler* OR teen* OR boy* OR girl* OR minors OR underag* OR (under NEXT/1 (age* OR aging)) OR juvenil* OR youth* OR kindergar* OR puber* OR pubescen* OR prepubescen* OR prepubert* OR school* OR preschool* OR highschool* OR pupil* OR (class NOT (‘social class’)) OR Classroom* OR parent* OR

father* OR mother* OR grandparent* OR grandfather* OR grandmother* OR grandchild* OR ((nuclear OR extended*) NEXT/1 famil*)):ab,ti) NOT ((‘health literacy’):ab,ti)

Web-of-science

TS=(((reading OR read OR reader*)) AND ((intervention* OR program* OR train* OR support* OR therap* OR treat* OR instruct* OR teach* OR taught OR “follow up” OR followup* OR (earl* NEAR/2 educat*) OR trial* OR random* OR (education* NEAR/2 model*) OR reward* OR incentive*)) AND ((motivat* OR unmotivat* OR amotivat* OR (Interest* NEAR/5 (personal* OR individual* OR situation*)) OR (read* NEAR/2 (attitude* OR dislike* OR enjoy* OR joy OR enthusias*)))) AND ((adolescen* OR infan* OR newborn* OR (new NEAR/1 born*) OR baby OR babies OR neonat* OR child* OR kid OR kids OR toddler* OR teen* OR boy* OR girl* OR minors OR underag* OR (under NEAR/1 (age* OR aging)) OR juvenil* OR youth* OR kindergar* OR puber* OR pubescen* OR prepubescen* OR prepubert* OR school* OR preschool* OR highschool* OR pupil* OR (class NOT (“social class”)) OR Classroom* OR parent* OR father* OR mother* OR grandparent* OR grandfather* OR grandmother* OR grandchild* OR ((nuclear OR extended*) NEAR/1 famil*))) NOT ((“health literacy”))) AND DT=(article)

Scopus

TITLE-ABS-KEY(((reading OR read OR reader*)) AND ((intervention* OR program* OR train* OR support* OR therap* OR treat* OR instruct* OR teach* OR taught OR “follow up” OR followup* OR (earl* W/2 educat*) OR trial* OR random* OR (education* W/2 model*) OR reward* OR incentive*)) AND ((motivat* OR unmotivat* OR amotivat* OR (Interest* W/5 (personal* OR individual* OR situation*)) OR (read* W/2 (attitude* OR dislike* OR enjoy* OR joy OR enthusias*)))) AND ((adolescen* OR infan* OR newborn* OR (new W/1 born*) OR baby OR babies OR neonat* OR child* OR kid OR kids OR toddler* OR teen* OR boy* OR girl* OR minors OR underag* OR (under W/1 (age* OR aging)) OR juvenil* OR youth* OR kindergar* OR puber* OR pubescen* OR prepubescen* OR prepubert* OR school* OR preschool* OR highschool* OR pupil* OR (class AND NOT (“social class”)) OR Classroom* OR parent* OR father* OR mother* OR grandparent* OR grandfather* OR grandmother* OR grandchild* OR ((nuclear OR extended*) W/1 famil*))) AND NOT ((“health literacy”))) AND doctype(ar)

Google scholar

intervention|program “reading motivation|attitude|enthusiasm”|”dislike|enjoy reading”|”motivated readers”
adolescents|infants|children|toddlers|kindergarten|school|preschool|highschool|Classroom|parents|father|mother|grandparents

Appendix 2B: Bibliographic Information, Intervention, Sample, Study, and Measurement Characteristics and Effect Sizes

Intervention Characteristics

No	Author 1 + year	Intervention name	Theoretical basis	Motivational mechanisms	Skills instruction	Text type	Provider	Number of sessions	Duration in hours
1	Aarnoutse 2003	-	REM	Int, aut, soc	Yes	Inf	Other	40	?
2	Andreassen 2011	ERCI	REM	Int, aut	Yes	Inf	Other	90	67.5
3	Bates 2016	RR	EVT, REM	Int, soc, comp	Yes	Nar	Other	80	40
4a	Bråten 2017	-	REM	Int	No	Inf	Researcher	1	0.28
4b		-	REM	Int	No	Inf	Researcher	1	0.28
5a	Cantrell 2016	LSC	REM	Comp	Yes	Both	Other	200	183.33
5b									
6	Cantrell 2014	LSC	REM	Comp	Yes	Both	Other	?	166.67
7	Cuevas 2012	ISR	IT	Int	Yes	Both	Other	14	14
8	Förster 2014	LPA+G	SDT	Comp, goa, att	No	Both	Other	8	?
9a	Fowler 1981	-	AT	Att	No	W/S	Researcher	3	?
9b		-	AT	Att	No	W/S	Researcher	3	?
10a	Guthrie 2004	CORI	REM	Int, aut, soc, comp, goa	Yes	Inf	Other	60	90
10b		CORI	REM	Int, aut, soc, comp, goa	Yes	Inf	Other	60	90
11	Guthrie 2000	CORI	REM	Int, aut, soc, comp, goa	Yes	Inf	Other	85	127.5
12a	Hautula 2022	RT-P	SCT	Comp	Yes	Nar	Other	8	12
12b									
12c		RT-G	SCT	Comp, goa	Yes	Nar	Other	8	12
12d									
13	Kao 2016	-	EVT	Int, comp	No	Nar	Researcher	1	0.5
14	Kim 2021	MORE	IT, REM	Int, aut, soc, comp, goa	Yes	Inf	Other	10	10

Intervention Characteristics (continued)

No	Author 1 + year	Intervention name	Theoretical basis	Motivational mechanisms	Skills instruction	Text type	Provider	Number of sessions	Duration in hours
15	Kurnaz 2020	PBASA	IT	Int	No	Both	Other	?	?
16a	Law 2011	-	AGT, SDT	Int, aut, soc, goa	Yes	Nar	Other	5	5
16b									
16c		-	AGT, SDT	Int, aut, soc, goa	Yes	Nar	Other	5	5
16d									
17	Lee 2014	PALS	REM	Soc, comp	Yes	Nar	Other	32	10.67
18a	Levinson 2017	-	IT	Int, comp	No	Both	Other	10	2.5
18b									
18c									
18d									
19	Marinak 2013	CRI	EVT	Int, aut, soc, comp	No	Both	Other	?	?
20a	Marinak 2008	-	SDT	Ext	No	Both	Researcher	1	?
20b		-	SDT	Ext	No	Both	Researcher	1	?
20c		-	SDT	Ext	No	Both	Researcher	1	?
21a	Monteiro 2013	PRP	REM	Int, aut, soc, comp, goa	Yes	Both	Researcher	24	12
21b									
22	Nevo 2020	-	REM	Int, aut, soc	Yes	Both	Other	260	195
23a	Ng 2013	-	AGT	Soc, comp, goa	Yes	Inf	Other	8	7
23b									
24	Schaffner 2007	-	SDT	Int, goa	No	Inf	?	1	0.75
25a	Schunk 1991	-	SCT, AGT	Comp, goa	Yes	Inf	Researcher	15	8.75
25b		-	SCT, AGT	Comp, goa	Yes	Inf	Researcher	15	8.75
26a	Shelton 1985	-	AT	Att	No	W/S	Researcher	6	3

Intervention Characteristics (continued)

No	Author 1 + year	Intervention name	Theoretical basis	Motivational mechanisms	Skills instruction	Text type	Provider	Number of sessions	Duration in hours
26b									
27a	Souvignier 2006	BTD	AGT	Goa, att	Yes	Both	Other	20	15
27b									
27c									
28	Taboada 2013	-	REM	Aut	Yes	Inf	Other	171	?
29	Taboada 2018	USHER	REM	Int, soc, comp	Yes	Inf	Other	25	18.75
30a	Taboada 2015	USHER	REM	Int, soc, comp	Yes	Inf	Other	35	52.50
30b									
31	Thames 1994	-	IT	Int, val	Yes	Both	Other	24	20
32	Toste 2017	MWR+MB	SCT	Comp	Yes	W/S	Other	24	16
33	Toste 2019	MWR+MB	SCT	Comp, goa	Yes	W/S	Other	40	26.67
34	Turan 2018	-	EVT	Int	No	Nar	Other	12	12
35a	Villiger 2012	LiFus	IT, SDT	Int, aut, soc, comp	No	Both	Other		46.67
35b									
36	Wigfield 2008	CORI	REM	Int, aut, soc, comp, goa	Yes	Inf	Other	60	90
37	Wigfield 2004	CORI	REM	Int, aut, soc, comp, goa	Yes	Inf	Other	60	105
38	Wolters 2017	-	SCT, AGT	Comp, goa	No	Both	Researcher	1	?
39	Wu 2021	-	SDT	Aut, soc, comp	Yes	Both	Other	18	12

Intervention names: ERCI = explicit reading comprehension instruction , RR = reading recovery, LSC = learning strategies curriculum, ISR = independent silent reading, LPA+G = learning progress assessment with goal setting, CORI = concept-oriented reading instruction, RT-P = readers' theater practice; RT-G = readers' theater goal; MORE = model of reading engagement; PBASA = personalized book advice smart application; PALS = peer assisted learning strategies, CRI = courageous reading instruction, PRP = paired reading program, BTD = becoming a text detective, USHER = United States history for engaged reading, MWR+MB = multisyllabic word reading with motivational beliefs, LiFuS = Lesen in Familie und Schule. Theoretical basis: REM = reading engagement model, EVT = expectancy-value theory, IT = interest theory, SDT = self-determination theory, AT = attribution theory, AGT = achievement goal theory, SCT = social cognitive theory. Motivational mechanisms: int = interesse, aut = autonomy, soc = social motivation, comp = (perceived) competence, goa = (mastery) goals, att = attributions, ext = extrinsic motivators, val = value of reading. Text type: inf = informational, nar = narrative, W/S = words/sentences.

Sample Characteristics

No	Author 1 + year	Educational stage	Struggling readers	% boys	N experimental condition; N control condition
1	Aarnoutse 2003	Primary	No	?	155; 172
2	Andreassen 2011	Primary	No	45	103; 113
3	Bates 2016	Primary	Yes	60	1334; 472
4a	Bråten 2017	Primary	No	46	44; 42
4b		Primary	No	46	44; 42
5a	Cantrell 2016	Secondary	Yes	59	605; 530
5b		Secondary	Yes	57	593; 535
6	Cantrell 2014	Secondary	Yes	58	523; 481
7	Cuevas 2012	Secondary	No	54	30; 70
8	Förster 2014	Primary	No	50	280; 285
9a	Fowler 1981	Primary	Yes	57	7; 7
9b		Primary	Yes	57	7; 7
10a	Guthrie 2004	Primary	No	48	148; 213
10b		Primary	No	53	195; 260
11	Guthrie 2000	Primary	No	53	79; 83
12a	Hautula 2022	Primary	Yes	42	49; 59
12b					
12c		Primary	Yes	45	50; 59
12d					
13	Kao 2016	Primary	No	?	20; 20

Sample Characteristics (continued)

No	Author 1 + year	Educational stage	Struggling readers	% boys	N experimental condition; N control condition
14	Kim 2021	Primary	No	49	450; 224
15	Kurnaz 2020	Secondary	No	51	300; 285
16a	Law 2011	Primary	No	48	94; 86
16b					
16c		Primary	No	52	99; 86
16d					
17	Lee 2014	Primary	No	45	53; 52
18a	Levinson 2017	Primary	No	35	6; 5
18b		Primary	No	35	6; 7
18c		Primary	No	35	5; 5
18d		Primary	No	35	5; 6
19	Marinak 2013	Primary	No	57	32; 44
20a	Marinak 2008	Primary	No	?	15; 15
20b		Primary	No	?	15; 15
20c		Primary	No	?	15; 15
21a	Monteiro 2013	Primary	Yes	?	40; 40
21b		Primary	Yes	?	40; 40
22	Nevo 2020	Primary	No	40	29; 29
23a	Ng 2013	Primary	Yes	53	25; 25
23b					
24	Schaffner 2007	Secondary	No	45	125; 125

Sample Characteristics (continued)

No	Author 1 + year	Educational stage	Struggling readers	% boys	N experimental condition; N control condition
25a	Schunk 1991	Primary	Yes	53	10; 10
25b		Primary	Yes	53	10; 10
26a	Shelton 1985	Primary	Yes	75	16; 16
26b					
27a	Souvignier 2006	Primary	No	50	95; 263
27b					95; 84
27c		Primary	No	50	115; 84
28	Taboada 2013	Primary	No	52	69; 50
29	Taboada 2018	Secondary	No	60	103; 100
30a	Taboada 2015	Secondary	No	51	378; 133
30b		Secondary	No	51	106; 154
31	Thames 1994	Primary	Yes	50	29; 29
32	Toste 2017	Primary	Yes	49	19; 22
33	Toste 2019	Primary	Yes	47	38; 7
34	Turan 2018	Secondary	No	?	36; 36
35a	Villiger 2012	Primary	No	48	244; 244
35b					
36	Wigfield 2008	Primary	No	?	164; 164
37	Wigfield 2004	Primary	No	?	150; 200
38	Wolters 2017	Secondary	Yes	47	30; 30
39	Wu 2021	Secondary	Yes	56	168; 174

Study Characteristics and Characteristics of the Outcome Measures

No	Author 1 + year	Design	Control group type	Measurement type	Developed within context of the study	Measurement time; number of weeks	ES motivation aff ; extr ; und ; comb	ES reading comprehension
1	Aarnoutse 2003	Quasi-exp.	Bau	Sr + test	Both	Direct	0.17; - ; - ; -	0.03
2	Andreassen 2011	Quasi-exp.	Bau	Sr + test	Both	Direct	0.01; -0.15; - ; -	-0.16
3	Bates 2016	Quasi-exp.	Bau	Sr	No	Direct	0.30; - ; - ; -	-
4a	Bråten 2017	Exp.	Bau	Sr + test	Yes	Direct	0.10; - ; - ; -	0.62
4b							-0.07; - ; - ; -	0.61
5a	Cantrell 2016	Exp.	Bau	Sr + test	No	Direct	- ; - ; - ; 0.13	0.15
5b				Sr + test			- ; - ; - ; 0.19	0.10
6	Cantrell 2014	Exp.	Bau	Sr + test	No	Direct	0.23; 0.26; - ; 0.15	0.04
7	Cuevas 2012	Exp.	Bau	Sr + test	No	Direct	- ; - ; - ; 0.62	0.62
8	Förster 2014	Quasi-exp.	Bau	Sr + test	No	Direct	-0.16; 0.03; - ; -	-0.02
9a	Fowler 1981	Quasi-exp.	Bau	Obs	No	Direct	0.58; - ; - ; -	-
9b							0.84; - ; - ; -	-
10a	Guthrie 2004	Quasi-exp.	Int.	Sr + test	Both	Direct	0.96; - ; - ; -	-0.16
10b		Quasi-exp.	Int.	Tr + test	Both	Direct	1.53; 1.51; - ; -	0.71
11	Guthrie 2000	Quasi-exp.	Bau	Sr	No	Direct	0.96; 0.27; - ; -	-
12a	Hautula 2022	Exp.	Int.	Sr + test	Yes	Direct	0.00; - ; -0.31; -	0.05
12b				Sr + test		Delayed; 28	0.09; - ; 0.00; -	-0.05
12c				Sr + test		Direct	-0.18; - ; -0.05; -	0.05
12d				Sr + test		Delayed; 28	-0.07; - ; -0.06; -	0.11
13	Kao 2016	Quasi-exp.	Int.	Sr + test	Both	Direct	1.31; - ; - ; -	1.19
14	Kim 2021	Quasi-exp.	Bau	Sr + tr + test	No	Direct	0.30; - ; - ; -	-0.09

Study Characteristics and Characteristics of the Outcome Measures (continued)

No	Author 1 + year	Design	Control group type	Measurement type	Developed within context of the study	Measurement time; number of weeks	ES motivation aff ; extr ; und ; comb	ES reading comprehension
15	Kurnaz 2020	Exp.	Bau	Sr	No	Direct	- ; - ; - ; 0.18	-
16a	Law 2011	Quasi-exp.	Bau	Sr + test	Both	Direct	0.30; 0.32; 0.05; -	0.45
16b				Test	Yes	Delayed; 13	- ; - ; - ; -	0.23
16c				Sr + test	Both	Direct	0.37; 0.13; -0.08; -	0.14
16d				Test	Yes	Delayed; 13	- ; - ; - ; -	0.24
17	Lee 2014	Quasi-exp.	Bau	Sr + test	No	Direct	0.37; - ; - ; -	0.38
18a	Levinson 2017	Quasi-exp.	Int.	Sr	No	Direct	0.06; - ; - ; -	-
18b							-0.11; - ; - ; -	-
18c							-1.14; - ; - ; -	-
18d							-0.01; - ; - ; -	-
19	Marinak 2013	Quasi-exp.	Bau	Sr	No	Direct	0.59; - ; - ; -	-
20a	Marinak 2008	Exp.	Bau	Obs	Yes	Direct	0.47; - ; - ; -	-
20b							-0.18; - ; - ; -	-
20c							-1.59; - ; - ; -	-
21a	Monteiro 2013	Quasi-exp.	Bau	Sr	No	Direct	0.53; 0.86; ; - ; -	-
21b				Sr			1.18; 0.15; - ; -	-
22	Nevo 2020	Quasi-exp.	Bau	Sr + test	No	Direct	1.32 ; - ; - ; -	1.39
23a	Ng 2013	Quasi-exp.	Bau	Sr + test	Both	Direct	0.28; 021; -0.05; -	0.50
23b				Sr + test	No	Delayed; 4	- ; - ; - ; -	0.77
24	Schaffner 2007	Exp.	Bau	Sr + test	Yes	Direct	0.14; - ; - ; -	0.13
25a	Schunk 1991	Exp.	Int.	Sr + test	No	Direct	-0.17; - ; - ; -	0.37

Study Characteristics and Characteristics of the Outcome Measures (continued)

No	Author 1 + year	Design	Control group type	Measurement type	Developed within context of the study	Measurement time; number of weeks	ES motivation aff ; extr ; und ; comb	ES reading comprehension
25b							1.00; - ; - ; -	1.47
26a	Shelton 1985	Exp.	Bau	Obs	Yes	Direct	1.69; - ; - ; -	-
26b				Obs	Yes	Delayed; 2	0.92; - ; - ; -	-
27a	Souvignier 2006	Quasi-exp.	Bau	Sr + test	No	Direct	-0.02; - ; - ; -	0.10
27b				Sr + test	No	Delayed; 22	0.42; - ; - ; -	0.20
27c				Sr + test	No	Direct	0.19; - ; - ; -	0.42
28	Taboada 2013	Quasi-exp.	Bau	Sr	No	Direct	0.20; - ; - ; -	-
29	Taboada 2018	Quasi-exp.	Bau	Sr + test	Both	Direct	0.02; - ; - ; -	0.15
30a	Taboada 2015	Quasi-ep.	Bau	Sr	Yes	Direct	0.14; - ; - ; -	-
30b				Sr			0.12; - ; - ; -	-
31	Thames 1994	Exp.	Bau	Sr	Yes	Direct	0.53; - ; - ; -	-
32	Toste 2017	Quasi-exp.	Bau	Sr + test	No	Direct	0.65; - ; - ; -	0.08
33	Toste 2019	Exp.	Bau	Sr + test	No	Direct	0.21; - ; - ; -	0.18
34	Turan 2018	Quasi-exp.	Bau	Sr	No	Direct	3.91; - ; - ; -	-
35a	Villiger 2012	Quasi-exp.	Bau	Sr + test	No	Direct	0.09; - ; - ; -	-0.01
35b				Sr + test		Delayed; 22	0.00; - ; - ; -	0.06
36	Wigfield 2008	Quasi-exp.	Bau	Sr + tr + test	Both	Direct	0.52; - ; - ; -	1.55
37	Wigfield 2004	Quasi-exp.	Int.	Sr	No	Direct	0.27; - ; - ; -	-
38	Wolters 2017	Exp.	Bau	Sr + test	No	Direct	0.52; 0.42; -0.03; -	0.15
39	Wu 2021	Exp.	Bau	Sr + test	Both	Direct	0.32; 0.96; - ; -	0.17

Design: exp = experimental, quasi-exp = quasi-experimental. Control group type: bau = business as usual, int = (part of) an intervention. Measurement type: sr = self-report, tr = teacher report, obs = observation. ES motivation: aff = affirming, extr = extrinsic, und = undermining, comb = combined.

Appendix 2C: Examples of Motivational Mechanisms in the Interventions

Motivational mechanism	Examples of how the motivational mechanisms are applied in interventions
Interest	• Recommending books related to students' interests (Kurnaz et al., 2020) • Hands-on activities such as dissecting an owl pallet before reading a text about owls (Guthrie et al., 2004)
Autonomy	• Choosing a text to read or generating questions to be answered after reading a text (Villiger et al., 2012) • Providing meaningful choices, for example of chapters to read or topics to write about (Taboada & Buehl, 2013)
Relatedness	• Cooperative learning in which students are responsible for their own learning and the results of the group (Villiger et al., 2012) • Shared reading with peers (Lee, 2014)
Competence	• Practicing a text so students are able to read it fluently (Villiger et al., 2012) • Teaching students to evaluate their progress in reading (Taboada et al., 2018)
Mastery goals	• Specifying goals for students to improve their own performance (Wolters et al., 2017) • Emphasizing what students can learn from a text and providing them opportunities to show that they understand the topic of a text (Law, 2011).
Attributions	• Reflecting on the origin of success so students will understand that putting effort into a task is worthwhile (Souvignier & Mokhlesgerami, 2006)
Value of reading	• Emphasizing the importance of reading by stressing how listening, speaking, reading, and writing are related (Thames & Reeves, 1994)
Extrinsic motivators	• Providing rewards to students, for example, books (Marinak & Gambrell, 2008)

Appendix 3: Checklist to Support Students' Book Choices (English Translation)

Date of the meeting:.....

What is the last book you read or which book are you reading currently?

.....

Did you finish the book?

o Yes
o No

Why/why not?

.....

If a student is still reading a book: Do you intend to finish the book?

o Yes, I want to finish the book.
o I'm not sure whether I want to finish the book.
o No, I don't want to finish the book.

Why/why not/why don't you know?

.....

How much do you like the book?

o Like very much
o Like
o Neither like nor dislike
o Dislike
o Dislike very much

Why do you find this?

.....

Do you find the book easy or difficult?

o Very difficult
o Quite difficult
o Neutral
o Quite easy
o Very easy

Why do you find this?

.....

Do you already know which book you want to read next?

o Yes *
o No ➜ choose a new book together with the student

* If this is a book from a series or genre that the student reads very often, you may suggest a different book which is also attuned to a student's reading level and interests.

Which book did you choose and why?

.....

Any additional remarks:

.....

Appendix 4A: Information Flyer for Parents in the Information Condition (English Translation)

Study enriched school libraries:
Reading in the home environment

de Bibliotheek op school

Dear parents/guardians,

Your son/daughter is participating in a study on enriched school libraries of the Vrije Universiteit Amsterdam. Earlier, you received a letter to inform you about this study. With this letter, we aim to inform you about the importance of leisure time reading.

Children who read a lot, will improve their reading skills and expand their vocabulary. Better reading skills benefit learning in school: many subjects in school require the reading of texts.

Therefore, it is of importance for children to read regularly. Reading during leisure time is important as well. This may include reading books, but also magazines or longer texts on the internet.

You can play an important role in stimulating your child to read. We provide some examples below. Of course, you can think of other ways as well.

- Try to choose a fixed moment with your child during which he or she takes time to read. Reading fifteen or thirty minutes before going to bed may lead to a routine. Further, this helps your child to relax before going to sleep.
- Talking with your child about books may motivate your child to read. You may for example ask your child which book he or she is reading, what the book is about, and whether or not your child likes the book.
- Even if children are able to read, they may like to engage in shared reading. Shared reading may contribute to reading pleasure and children's reading development. You may choose to read aloud in the book your child is reading or choose a book just above your child's reading level.
- You can stimulate your child to read by leading by example. If children see their parents are regularly reading books, they may be more inclined to start reading as well.

Appendix 4B: Information Flyer for Parents in the Nudge Condition (English Translation)

Study enriched school libraries:
Reading in the home environment

de Bibliotheek op school

Dear parents/guardians,

Your son/daughter is participating in a study on enriched school libraries of the Vrije Universiteit Amsterdam. Earlier, you received a letter to inform you about this study. With this letter, we aim to inform you about the importance of leisure time reading.

Children who read a lot, will improve their reading skills and expand their vocabulary. Better reading skills benefit learning in school: many subjects in school require the reading of texts.

Therefore, it is of importance for children to read regularly. Reading during leisure time is important as well. This may include reading books, but also magazines or longer texts on the internet.

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- Try to choose a fixed moment with your child during which he or she takes time to read. Reading fifteen or thirty minutes before going to bed may lead to a routine. Further, this helps your child to relax before going to sleep.
- Talking with your child about books may motivate your child to read. You may for example ask your child which book he or she is reading, what the book is about, and whether or not your child likes the book.
- Even if children are able to read, they may like to engage in shared reading. Shared reading may contribute to reading pleasure and children's reading development. You may choose to read aloud in the book your child is reading or choose a book just above your child's reading level.
- You can stimulate your child to read by leading by example. If children see their parents are regularly reading books, they may be more inclined to start reading as well.

Of course, we understand that stimulating your child to read may escape your attention because of the hassle of daily activities. Therefore, we will send you reminders via WhatsApp in the upcoming period. You will see various images, for example, the image displayed alongside.

Appendix 4C. Schema Used for Sending Nudges in Primary Education.

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Week 1		18.00			16.30		
Week 2	20.00			18.30			
Week 3			14.00				17.00
Week 4		15.30				10.30	
Week 5	19.00				17.30		
Week 6				16.00			11.30
Week 7			19.30			14.00	
Week 8		11.30			20.00		
Week 9	17.30			19.30			
Week 10			15.30				14.00
Week 11		19.00				11.30	
Week 12	16.00				18.30		
Week 13				17.00			10.30
Week 14			18.00			16.30	

Appendix 4D. Schema Used for Sending Nudges in Prevocational Secondary education

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Week 1				18.30			15.00
Week 2			17.00			14.00	
Week 3		18.00			16.30		
Week 4	20.00			16.00			
Week 5			19.30				11.30
Week 6		17.00				21.00	
Week 7	19.00				20.30		
Week 8				17.30			14.00
Week 9			20.30			11.30	
Week 10		16.30			20.00		
Week 11	17.30			19.30			
Week 12			18.00				21.00
Week 13		19.00				15.00	
Week 14	16.00				18.30		

AUTHOR CONTRIBUTIONS

Effectiveness of interventions that foster reading motivation: A meta-analysis

Lisa van der Sande	Design of the study, selection and coding of studies, writing – original draft
Roel van Steensel	Design of the study, writing – review & editing, supervision
Suzanne Fikrat-Wevers	Selection and coding of studies
Lidia Arends	Data-analysis

Personalized expert guidance of students' book choices in primary and secondary education

Lisa van der Sande	Design of the study, recruitment and data collection, data-analysis, writing – original draft
Ilona Wildeman	Design of the study, recruitment and data collection,
Adriana Bus	Design of the study, writing – review & editing, supervision
Roel van Steensel	Design of the study, writing – review & editing, supervision

Nudging to stimulate reading in primary and secondary education

Lisa van der Sande	Design of the study, recruitment and data collection, data-analysis, writing – original draft
Ilona Wildeman	Design of the study, recruitment and data collection,
Adriana Bus	Design of the study, writing – review & editing, supervision
Roel van Steensel	Design of the study, writing – review & editing, supervision

DANKWOORD (ACKNOWLEDGEMENTS IN DUTCH)

Ik wil iedereen die, direct of indirect, heeft bijgedragen aan de totstandkoming van dit proefschrift enorm bedanken! Allereerst mijn promotoren, Roel van Steensel en Adriana Bus. Roel, bedankt dat je altijd bereid was om mee te denken en mijn stukken steeds weer voorzag van uitgebreide feedback. Naast mijn promotietraject hebben we ook samengewerkt op de EUR, bij het onderzoek naar Zin in Lezen en binnen het Leesbevorderingslab. Ik heb deze samenwerking als heel prettig ervaren en hoop dat we dit ook na mijn promotie kunnen voortzetten. Adriana, bedankt voor je vele ideeën en feedback, waarmee je mij steeds stimuleerde om mijn onderzoek te verbeteren.

Leden van de promotiecommissie: Jacqueline Bel, Martine Coene, Jeroen Dera, Hilde van Keer en Eliane Segers, bedankt voor de tijd die jullie hebben genomen voor het lezen en beoordelen van mijn proefschrift.

Ilona, bedankt voor de fijne samenwerking op de dBos projecten en het meedenken over de uitvoering van de interventies en de dataverzameling. Lidia, bedankt voor het uitvoeren van de analyses voor de meta-analyse, ook toen dit na de update van de zoekopdracht weer opnieuw moest en meer werk bleek dan van te voren verwacht. Suzanne, bedankt voor het meedenken en dubbelcoderen van de studies in de meta-analyse. Ik wil ook de (scriptie)studenten bedanken die hebben geholpen met het uitvoeren van de dataverzameling en het invoeren en coderen van de data. Ook wil ik alle leerlingen, ouders, leerkrachten en leesconsulenten bedanken die hebben deelgenomen aan mijn onderzoek. Zonder jullie was het niet mogelijk geweest dit onderzoek uit te voeren.

Ieder promotietraject kent hoogte- en dieptepunten en dan is het fijn om dit met betrokken collega's te kunnen delen. Merel, Ilona, Rosalie en Mira, bedankt dat jullie altijd klaar stonden om even een praatje te maken en voor de gezelligheid tijdens lunch- en koffiepauzes, borrels en congressen. Merel, het was fijn om dit traject grotendeels met jou te doorlopen, van samen de afdeling leren kennen, tot het volgen van cursussen, voorbereiden van presentaties en telefoongesprekken om bij te kletsen tijdens het thuiswerken.

Ook mijn collega's met wie ik de afgelopen jaren heb samengewerkt bij het onderzoek naar Zin in Lezen en binnen het Leesbevorderingslab wil ik op deze plaats bedanken. Roel, Marjolein, Jo, Nina, Camille, Jacqueline en Mira, bedankt voor de fijne samenwerking, waardoor ik mijn postdoc zo goed mogelijk kon combineren met het afronden van mijn promotieproject. Nina, we hebben het afgelopen half jaar veel en

prettig met elkaar samengewerkt. Hopelijk kunnen we deze samenwerking voortzetten en anders zien we elkaar zeker nog in Utrecht!

Tot slot wil ik mijn lieve vrienden en familie bedanken voor jullie betrokkenheid en interesse. Ik heb vaak de vraag gehad hoe het met mijn onderzoek ging (en of mijn proefschrift nou al bijna klaar was...). Maar gelukkig was er daarnaast ook genoeg tijd voor etentjes, borrels en high-tea's, weekendjes weg, fietstochten en wandelingen, HDBDZD activiteiten, spelletjesavonden enzovoort. Bedankt voor alle gezelligheid en dat jullie altijd voor me klaar staan!

ABOUT THE AUTHOR

Lisa van der Sande was born on November 6, 1991, in Gorinchem, the Netherlands. After completing secondary school at gymnasium Camphusianum in Gorinchem, she went to study at Utrecht University in 2010. She completed the bachelor Pedagogical Sciences in 2013 and the research master Educational Sciences: Learning in Interaction (EdSci) in 2015. During this master's program, Lisa followed a clinical track, in which she obtained the NVO basic child psychologist certificate. Further, she worked as a research assistant in various research projects.

In September 2015, Lisa started as a junior researcher at Erasmus University Rotterdam, where she investigated the effectiveness of reading motivation interventions. In December 2016, she started her PhD trajectory at the department of Language, Literature, and Communication at the Vrije Universiteit Amsterdam under supervision of prof. dr. Roel van Steensel and prof. dr. Adriana Bus.

Currently, Lisa works as a postdoctoral researcher at the department Educational and Family studies of the Vrije Universiteit Amsterdam, where she focuses on the Zin in Lezen (Desire to Read) approach and takes part in the Reading Promotion Lab.

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Presentations at international conferences (peer-reviewed)

Van der Sande, L., Dobber, M., Meima, J., & Van Steensel, R. (2023). *Implementation of two professional development trajectories for reading instruction* [Paper presentation]. European Association for Research on Learning and Instruction (EARLI), Thessaloniki, Greece.

Van der Sande, L., Dobber, M., Van Schaik, J. E., & Van Steensel, R. (2021). *De leesattitude van beginnende lezers in groep 2 en 3* [Reading attitude of beginning readers in kindergarten and Grade 1; Poster presentation]. Onderwijs Research Dagen (ORD), Utrecht, the Netherlands (online).

Van der Sande, L., Dobber, M., Van Schaik, J. E., & Van Steensel, R. (2021). *Reading attitude of beginning readers in kindergarten and Grade 1* [Paper presentation]. European Association for Research on Learning and Instruction (EARLI), Gothenburg, Sweden (online).

Van der Sande, L., Dobber, M., & Van Steensel, R. (2023). *De rol van agency bij de implementatie van twee professionaliseringstrajecten voor leesonderwijs* [The role of agengy in the implementation of two professional development trajectories for reading instruction; Paper presentation]. Onderwijs Research Dagen (ORD), Amsterdam, the Netherlands.

Van der Sande, L., Dobber, M., & Van Steensel, R (2022). *Desire to read* [Paper presentation]. SIG-8 meeting of the European Association for Research on Learning and Instruction (EARLI), Dresden, Germany (online).

Van der Sande, L., Dobber, M., & Van Steensel, R. (2022). *Het effect van Zin in Lezen op leesattitude, leesbegrip, woordenschat en (voorspellers van) technisch lezen bij leerlingen in groep 2, 3 en 4* [The effects of Desire to Read on reading attitude, reading comprehension, vocabulary and (predictors) of decoding skills in students in kindergarten, Grade 1, and Grade 2; Poster presentation]. Onderwijs Research Dagen (ORD), Hasselt, Belgium.

Van der Sande, L., Van Steensel, R., & Arends, L. (2016). *Effectiveness of interventions that foster reading motivation: A systematic review and meta-analysis* [Paper presentation] Emerging Researchers' Conference of the European Conference on Educational Research (ECER), Dublin, Ireland.

Van der Sande, L., Van Steensel, R., & Bus, A. G. (2018). *Supporting students' book selection behavior: Effects on reading motivation, reading behavior, and reading comprehension levels* [Paper presentation]. Society for the Scientific Study of Reading (SSSR), Brighton, United Kingdom.

Van der Sande, L., Van Steensel, R., Fikrat-Wevers, S., & Arends, L. (2021). *Effectiveness of interventions that foster reading motivation: A meta-analysis* [Paper presentation]. European Association for Research on Learning and Instruction (EARLI), Gothenburg, Sweden (online).

Van der Sande, L., Wildeman, I., Bus, A. G., & Van Steensel, R. (2021). *Personalized expert guidance of students' book choices in primary and secondary education.* [Paper presentation]. Society for the Scientific Study of Reading (SSSR), Lancaster, United Kingdom (online).

Van der Sande, L., Wildeman, I., Van Steensel,, & Bus, A. G. (2019). *Stimulating reading routines: The effects of* nudging [Poster presentation]. European Association for Research on Learning and Instruction (EARLI), Aachen, Germany.

Other presentations

Van der Sande, L., Van Steensel, R., & Arends, L. (2016). *Effecten van leesmotivatie-interventies: Uitkomsten van een meta-analyse* [Effects of reading motivation interventions: Outcomes of a meta-analysis; Paper presentation].Wetenschappelijk congres Stichting Lezen, Amersfoort, the Netherlands.

Van der Sande, L., Van Steensel, R., & Bus, A. G. (2018). *De Bibliotheek op school: Ondersteuning van de boekenkeuze* [The library at school: Supporting book choices; Paper presentation]. Inspiratiedag: Van BoekSartbaby tot Leesbeest op school, Amsterdam, the Netherlands.

Van der Sande, L., Van Steensel, R., & Bus, A. G. (2020). *De Bibliotheek op school: Ondersteuning van de* boekenkeuze [The library at school: Supporting book choices; Paper presentation]. NRO conferentie onderwijsachterstanden, Amersfoort, the Netherlands.

Van der Sande, L., Van Steensel, R., & Bus, A. G. (2020). *De Bibliotheek op school: Ondersteuning van de boekenkeuze* [The library at school: Supporting book choices; Paper presentation]. Tel mee met Taal congres, Utrecht, the Netherlands.

Van der Sande, L., Wildeman, I., Van Steensel, R., & Bus, A. G. (2018). *De Bibliotheek op school: Ondersteuning van de boekenkeuze* [The library at school: Supporting book choices; Paper presentation]. Wetenschappelijk congres Stichting Lezen, Driebergen-Rijsenburg, the Netherlands.